Chicago, Burlington & Quincy Railroad:
Roundhouse and Locomotive Shops
Broadway and Spring Streets
Aurora, Illinois
Kane County

HAER No. IL-8

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

PHOTOGRAPHS

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

ADDENDUM TO
CHICAGO, BURLINGTON AND QUINCY RAILROAD,
ROADHOUSE AND SHOPS
Broadway and Spring Streets
Aurora
Kane County
Illinois

HAER No. IL-8

XEROGRAPHIC COPIES OF COLOR TRANSPARENCIES

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
Washington, D.C. 20013

HISTORIC AMERICAN ENGINEERING RECORD

Chicago, Burlington & Quincy Railroad
Roundhouse & Backshop Complex
Aurora, Kane County, Illinois

Location: North Broadway between Spring and Pierce Streets, Aurora, Kane County, Illinois.
UTM: 16.391250.4623870
Quad: Aurora North

Date of Construction: 1855 - 1954

Present Owner: Burlington Northern Railroad
176 East Fifth Street
St. Paul, Minnesota 55101

Present Use: Discontinued shop operations in 1974. Presently in disuse; to be converted to regional transit center.

Significance: The Chicago, Burlington & Quincy Roundhouse and Backshop Complex are all that remain of what once was one of the midwest's largest railroad shop facilities. In the era of steam these were the major repair and construction shops for the railroad, employing as many as 2,000 workers in periods of peak operation. During the twentieth century, changes from the construction and repair of steam locomotives to the construction of parts for streamlined passenger cars paralleled developments throughout the railroad industry.

Project Information: The Chicago, Burlington & Quincy Railroad Roundhouse & Backshop Complex was documented by Dennett, Muessig, Ryan & Associates, Ltd. (Iowa City, Iowa) for the National Park Service in 1983. The project team consisted of John G. Kolp, Historian; Hans Muessig and J Ceronie, Photographers; Bruce Harms, Photographer and Report Illustration; Marie Neubauer, Report Graphics Production; and John W. Johnson, Special Consultant.

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PART I

HISTORICAL BACKGROUND

The Chicago, Burlington and Quincy Railroad Roundhouse and attached backshop complex located in Aurora, Illinois, are a group of intricately-connected structures built between 1855 and 1954. The complex is all that remains of an extensive railroad shop facility that once filled the 60-acre industrial site on the east side of the Fox River. Extant structures include a roundhouse, 3 attached machine shops, a rod shop, a blacksmith shop, boiler room, tool room, and wheel corridor and bay. They are an important part of America's engineering heritage not only because of their age and architectural features but because of their contribution to the development of midwestern railroads in general and the CB&Q in particular.

Portions of the complex are among the oldest railroad shop buildings in the United States. The roundhouse is the oldest full roundhouse still standing, pre-dating by some 10 years the Baltimore & Ohio West and East Roundhouses (1866 and 1870-72) in Martinsburg, West Virginia (HAER WV-1A & 1B). It may also be the only stone roundhouse still standing. The stone machine shop (1856) ranks with the B&O Machine Shop in Grafton, West Virginia (1853-54), and the Central of Georgia Savannah Repair Shops (1850's) as the oldest railroad structures of that type (HAER WV-10 and GA-1). The Aurora boiler/engine room (1856), machine/erecting shop (1863), and the combination blacksmith and boiler shop (1873) are also noteworthy because of their age.[1]

Of equal importance, however, is the role these buildings and others that once shared the same site played in American railroad development and in the growth of the Chicago, Burlington and Quincy Railroad. As the first company shops, they served as the principal repair and construction facility for both locomotives and cars during the nineteenth century. Expansion of the CB&Q west into Iowa, Missouri, Nebraska, and Colorado brought with it the construction of additional shops, but Aurora's central role remained strong until well into the twentieth century. The Aurora shops were the city's principal industry during the nineteenth century, and issues related to the acquisition of additional land, economic cycles of boom and bust, and labor unrest all profoundly affected the local community.

THE AURORA SHOPS AND THE GROWTH OF THE CB&Q: AN HISTORICAL OVERVIEW

American railroad development can be divided into a number of distinct stages. From 1830 to 1850, railroads were thought of and developed as supplements to the existing coastal and inland waterway system of the United States. Short-line railroads radiated from most of the major seaboard cities, and canals and rivers of the eastern states were linked by rail. Further west, shipping points on the Great Lakes and the Ohio River were connected, and planners looked to railroad links with the Mississippi River as the next logical goal. By 1860, however, this relationship between rail and water transport had been so radically altered that railroads carried more freight than the inland waterways.

The period from the end of the Civil War to 1920 has rightly been called the Age of Railroads. During these 50 years, track mileage increased 5-fold and railroads came to have an almost monopolistic hold on all areas of transportation. By 1900, almost every thing and every person moving more than 15 miles was transported by the railroads. The first decades after the Civil War witnessed the completion of the midwest rail network and the construction of the first transcontinental road. In the following decades, additional transcontinental lines were constructed and fierce competition arose over access to these lines. Finally, at tbe end of the century, multiple roads between major metropolitan markets were developed. This over-building eventually forced many companies to consolidate.

Railroad's hold on the American transportation system continued into the 1930's, but the economic system that emerged following the Second World War included a major role for the automobile and the airplane. The inter-state highway system and the jumbo jet took over the transportation of people, leaving the railroads and the trucking industry to fight over America's freight business. These nation-wide patterns can be seen in both the general history of the Chicago, Burlington and Quincy Railroad and in developments at the shop complex at Aurora, Illinois.[2]

The history of the CB&Q Railroad and of the Aurora shop complex began with a meeting of businessmen from the Illinois towns of Batavia and Aurora in late 1848. Out of that meeting and a number of others held in early 1849, came a concerted set of financial and legal plans that led to the issuing of a state charter for the Aurora Branch Railroad on February 12, 1849. Initial plans called for the construction of 12 miles of track and roadbed from Aurora north through Batavia to a junction with the Galena and Chicago Union Railroad

at what is now West Chicago. Before the track construction phase was completed in late 1850, the small company was already looking for a place to build terminal facilities on the east side of the Fox River in Aurora. When regular service between Chicago and Aurora began on October 21, 1850, the CB&Q had arranged to share the Galena railroad depot in Chicago and had constructed a temporary building on the north edge of the property that would eventually hold the large shop complex in Aurora.[3]

During the next 4 years, the principal Illinois components of what would become the CB&Q railroad fell into place. Numerous charters had been issued by the state that provided for construction of crucial segments of a system that could link Chicago and the Mississippi River, but no company had complete control of a direct route across the state: the Peoria and Oquawka Railroad planned to link these 2 cities on the Illinois and Mississippi Rivers; the Northern Cross Railroad hoped to run a line southwest from the terminus of the Michigan-Illinois Canal to Quincy; the Central Military Tract Railroad intended to parallel part of this route from Galesburg to the canal; and the Aurora Railroad developed a plan for a route leading southwest towards Galesburg and the Mississippi. This competition to construct and control a southwestern route to the Mississippi depended primarily upon the abilities of the respective companies to raise the necessary capital to finance track construction. The Aurora Railroad's success in attracting such money as early as 1852 was critical in the race for control of the southwestern corridor across the state.

In 1852, the company changed its name to the Aurora and Chicago Railroad, and in the following year completed the 46 mile stretch from Aurora west to Mendota. The Peoria and Oquawka completed tracks from Galesburg to the

Mississippi River opposite Burlington in 1855, and in 1856 the Northern Cross opened service between Galesburg and Quincy. A new state charter issued in February 1854, allowed the Aurora and Chicago, the Central Military Tract, the Northern Cross, and the Peoria and Oquawka to consolidate in whatever arrangement seemed feasible. The first step toward this end occurred on July 9, 1856, when the Central Military Tract merged with the newly re-named Chicago, Burlington and Quincy Railroad. In 1864 consolidations with the Quincy and Chicago (formerly Northern Cross) and the Peoria and Burlington put into place the main Illinois lines of the CB&Q system.

The completion of track west from Aurora in 1853 and the proposed merger of a number of lines in 1854 meant that the growing system would need to select sites for and build appropriate repair shops and terminal facilities at strategic points along the line. Temporary shops on leased land in Chicago were proving to be both expensive and inadequate for the system.[4] Sometime in mid-1855, the company board resolved to obtain the necessary land, hopefully without cost, to build appropriate shop facilities on the east side of the river in Aurora. Reports of the proposed construction were first published in September[5], and by November land condemnation and compensation were being settled. In early December, construction had begun, but probably little more than the foundations of the "car factory" and "machine shops" were completed before activities were suspended for the winter.[6]

Construction began anew in 1856, but by July the buildings were not much more than half completed. The wooden car shops were completed by early September, and in October the stone cutters and masons were finishing the walls of the roundhouse and machine shop. When the CB&Q issued its annual report to stockholders in June 1857, it could proudly note that the "expensive

Machine & Repairing Shops at Aurora have been completed, upon a scale commensurate with the increasing stock of the Company..."[7]

The new shops cost about $150,000 and included 7 buildings: "a Round House, 264 feet in diameter or 792 feet in circumference, and 18 feet high, above the grade; Machine Shop, 180 feet long by 50 feet wide, and 32 feet high; Blacksmith Shop, 154 by 50, and 14 feet high; Car Shop, 154 by 63 feet, and two stories in height; Paint Shop, 200 by 30 feet, two stories high; Carpenter Shop, 100 feet by 30, and an Engine Room, 38 by 24 feet...surmounted by a chimney 85 feet high,.." By early 1857, a 90' by 40' (27.43 m x 12.19 m) section had been added to the car shops and several small warehouses and a lumber kiln resided on the property.[8]

The best representation of the complex following this first phase of construction is a lithograph based on an ambrotype taken sometime in 1857 or 1858 (see photograph HAER IL-8-77).[9] In this view of the complex looking northwest can be seen the roundhouse with the original set of 22 stalls. The 2-story stone machine shop with the single story engine house and chimney are just north of the roundhouse. Barely visible behind the machine shop is the 1-story blacksmith shop with forge chimneys arranged along the outside wall. Immediately behind the machine shop is the car shop, part single and part double storied. The building to the far right of the picture is probably the carpenter shop. The paint shop was located just out of this view, next to the carpenter shop and behind the blacksmith shop. Figure 1 is a site plan of the complex at this point in time.

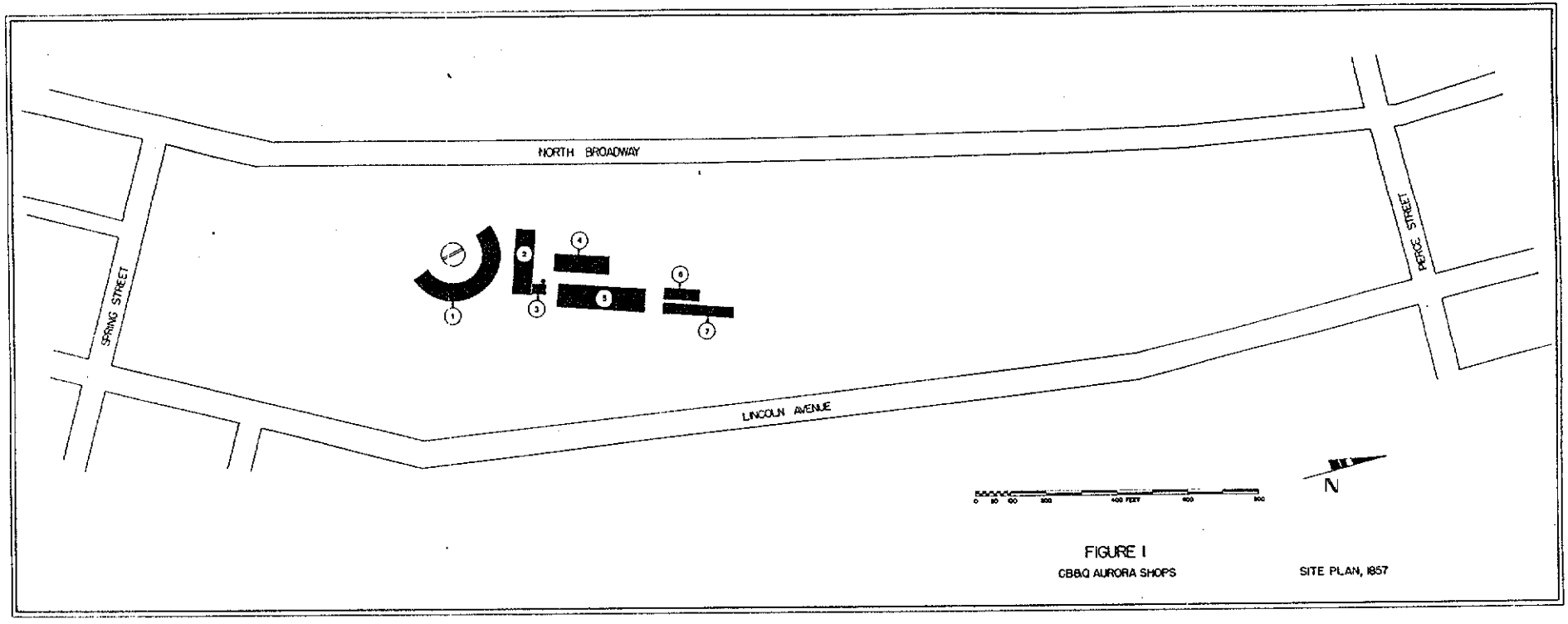

FIGURE I
CB&Q AURORA SHOPS SITE PLAN, 1857

KEY

1. Roundhouse (1856)
2. Machine Shop (1856)
3. Boiler Room (1856)
4. Blacksmith Shop (1856)
5. Car Shop (1856, 1957)
6. Carpenters Shop (1856)
7. Paint Shop (1856)

Shortly after this set of shops was completed, a major bank failure in New York City produced a financial panic which placed the nation in a mild depression until the early stages of the Civil War. When the CB&Q issued its annual stockholder's report in June, 1858, the effect of the down-turned economy had barely been felt. The next 2 fiscal years, however, were a good deal more somber for both company officers and stockholders: no dividends were paid, and revenues were off by as much as 30%. Not until the end of the 1860-61 year was recovery apparent. During this period only minimal expenditures were made by the company, although in 1858-59 over $5,000 was spent to add 8 stalls to the Aurora roundhouse.[10]

The Civil War strengthened the general economy of the North and railroads played a major role in the movement of troops and supplies. In addition to a general increase in business created by the war, 30 of the company's freight cars were taken over by the Union Army under the authorization of General Grant. Replacing these cars and other equipment became a top priority. In the summer of 1863 orders went to outside firms for 15 additional locomotives and perhaps as many as 200 cars. Construction within the company's shops at Aurora and Galesburg was also stepped up during that same year, with approximately 200 grain and merchandise cars being built.[11]

Major increase in the traffic carried by the road placed heavy demands on repair and construction facilities, and during the first 3 years of the War a number of additions were made to the Aurora complex. A machine shop was added to the car shop, a copper shop constructed, and an addition made to the drying kiln in 1860-61. During the next year a few minor improvements were made including an oil house and a snow plow house. More extensive improvements were made in 1863. The locomotive department added 2 fire-proof buildings,

one between the roundhouse and stone machine shop, and the other between the machine shop and the wooden blacksmith shop. A shop for mending T-rail and storing iron for this department was also built. The car department also expanded, with construction of a shop for bending truck and other iron, a store-house, and a paint shop, as well as an extension to the car machine shop. Over $18,000 were spent during these 3 years on improvements at Aurora.[12]

The war-time productivity of the shops was dealt a severe blow in mid-December 1863, when the stone machine shop was seriously damaged by a major fire. Both because of the snow and ice on the roofs of adjoining buildings and their stone and iron construction, the fire spread no further. The machine shop and its contents, however, accounted for losses of nearly $250,000, including damage to the building itself, major pieces of machinery, the stationary engine, a first-class locomotive, parts of several others under repair, and virtually all of the company's wooden construction patterns (which were stored in the second story of the building). Immediately following the blaze, company officials announced that the shop would be rebuilt as a 1-story building with some enlargement to its area. The shop was rebuilt using the original walls of the first story and the engine/boiler room wing was expanded slightly.[13] No specific references have been found related to the reconstruction of the machine shop, but it is assumed that it was rebuilt the following year.

Other improvements during the last years of the War included a 701' artesian well to supply water for the locomotives and stationary engines, an engine house for the car department, a new coal house, a fence around the complex, a new brick kiln, and a frame storehouse for the purchasing

department. Sometime late in 1865 or early in 1866, the final 10 stalls were added to the roundhouse making it a complete circle.[14]

The company's major interests at the end of the Civil War were directed towards railroads moving west across both Iowa and Missouri. In 1868, bridges over the Mississippi River were completed at both Burlington, Iowa, and Quincy, Illinois, thus linking the CB&Q with the Hannibal and St. Joseph Railroad in Missouri and the Burlington and Missouri River Railroad in Iowa. Although both of these companies and the Burlington and Missouri Railroad operating in Nebraska were separate organizations, the major stockholders and board members were intertwined to such an extent that the "Burlington system" was already much larger than it appeared on paper. In 1872, the CB&Q formally leased the Burlington and Missouri River Railroad providing it complete control of the route across southern Iowa. Three years later the 2 companies were consolidated into a new Chicago, Burlington and Quincy Railroad Company. The CB&Q was the largest railroad operating in the state of Illinois in 1871, and was looking towards the day when it would hold a similar position in other states.[15]

The growth in the the number of trains operated by the system during this period meant that repair and construction facilities had to be expanded to keep up with the demand. In 1858 the road operated 58 locomotives, 103 by 1864, 122 in 1868, and 165 by 1872. Since at least half of these were assigned to Aurora, the single roundhouse proved quite inadequate. Consequently, in 1867 the company decided to investigate the possibility of building a new shop complex either in Aurora or in Chicago. After some difficult negotiations with the City of Aurora, additional lands were obtained and a major improvement program was begun. A second roundhouse 270' in

diameter with 15 stalls was constructed in late 1868 or early 1869. This also became inadequate quickly and the construction of 25 additional stalls was begun in the fall of 1871 and completed before June 1872.[16]

An increase in the number of locomotives handled at Aurora dictated that enlarged facilities for fuel supplies would also be needed. In 1856 the company began experiments with coal as a replacement for wood. More experiments were conducted in 1858 and by 1865 there were few wood burners left in the system. Efficiencies in the handling of coal now became the chief concern and a Kerr Patented Coal Chute was installed in 1869 to facilitate both the delivery of coal by wagon and its transfer to locomotive tenders.[17]

Locomotive construction was also taking place at Aurora by the late 1860's and such activity required new and improved foundry capabilities which were completed in late 1871. This building, 184' by 62' (56.08 m x 18.9 m) with a 97' by 62' (29.57 m x 18.9 m) L took the place of an earlier foundry that had been displaced by the new roundhouse. The arrangements for the operation of the new foundry were fairly unusual. The railroad owned the land, buildings, and fixtures of the foundry, but it was operated by a separate firm, Bouton and Co. No written agreement existed between the 2 companies, but the foundry furnished the CB&Q with all necessary car, locomotive, and tender truck wheels, as well as a variety of other castings needed for locomotive and car construction. The railroad paid set prices for these items, and in return the foundry bought old wheels and other castings from the CB&Q for a specific amount. Exactly how long this arrangement lasted is unclear.[18]

The Aurora car department handled about 50% of the car-related business for the railroad. The shops produced the first sleepers for the line in 1858

when they remodelled 2 regular passenger coaches. They also built cars for Pullman, including one of his early "hotel" cars, City of New York, in 1866, and the first American diner, The Delmonico, in 1868. In 1871, the shops built 100 passenger cars, and did major overhauls to 146 passenger, mail, Pullman, and way cars. The following year, the car department built 2 parlor cars for the Pullman Company and 3 day cars with new heating and ventilating systems for the CB&Q. Several postal cars were constructed at the shops in 1873. Freight car activity was even more extensive: they built 395 of these cars in 1871 and performed minor repairs on 2,100 box cars and 800 flat cars.[19]

Like the locomotive department, the car shops were also improved to handle the increasing traffic of the road. A new blacksmith shop for the car department measuring 90' by 200' (27.43 m x 60.96 m) was completed in 1870 at a total cost of over $48,000. A separate brick pattern shop, 85' by 40' (25.91 m x 12.19 m), was also constructed in the northwest corner of the complex in 1872 and a coach shed was added in 1871.[20]

Fire was always a serious threat to any manufacturing firm in the nineteenth century and a railroad shop complex with numerous forges, furnaces, flammable materials, and operating locomotives was particularly susceptible to this danger. To guard against this potential problem, the shops acquired their own fire engine in 1872 to supplement the engines available in the City. Despite these precautions, a fire broke out in the paint shop on May 18, 1873, which destroyed that building and then spread to other wooden structures on the grounds. The car department lost almost everything, including the paint shop, coach shop, carpenter shop, store house, dry sheds, lumber office, dry kiln, freight car shop, machine shop, and tin shop. The locomotive department also

suffered major losses including the complete destruction of the blacksmith shop and brass foundry. The locomotive machine shop and engine room which were attached to the blacksmith shop were not damaged because of their stone and iron construction. The company put the loss at $224,000, part of which was covered by insurance.[21]

Company officials announced shortly after the fire that new shops would be built immediately using plans the company had been considering for several years. In late May and early June, James Walker, President of the CB&Q, was in Boston conferring with directors about the reconstruction. A. Walbaum, a local builder, was given the contract for the work which was to be completed in 60 days. Foundation and brick work was begun in July for the locomotive blacksmith shop. The roof of this building was completed in October and normal activities were resumed by the end of that month. Construction of the other buildings followed a similar schedule: brick work and the erection of roof trusses for car shops were in progress late in October. These buildings were finished in 1874 and included a wood working shop (300' by 80'; (91.44 m x 24.38 m)), an attached engine room with 124' (37.80 m) chimney, and a car shop and a coach shop (310' by 80' each; (94.49 m x 24.38 m)). Two transfer tables were also placed between the car, coach, and wood working shops. The design of the car shops was similar to the car blacksmith shop constructed 2 years earlier, with walls 22 1/2' (6.86 m) high surmounted by wooden roof trusses. The new blacksmith shop and car engine house had iron roof trusses, and all new buildings except the engine house had slate laid in mortar on boards as a roof covering.[22]

It was extremely fortunate for the CB&Q that the shops were reconstructed as rapidly as they were, for in the fall of 1873 a financial panic initiated a

nation-wide depression that lasted 4 years. The CB&Q made it through these difficult years, but not without major reductions in employment and wages, a strike, and greatly reduced expenditures for facilities.

Economic prospects for the railroads brightened in 1878, with increased traffic and renewed thoughts of westward expansion. In 1880, the Burlington and Missouri Railroad in Nebraska was formally consolidated into the CB&Q system allowing traffic to run from Chicago to western Nebraska completely on company-owned rails. That same year a decision was made to push on to Denver, and in the fall of 1881 the enormous building effort began. Denver was reached in May 1882; construction crews had covered the 247 miles in 229 days. Remarkable as this effort was, it coincided with massive efforts by other companies to expand their trackage. More new track was laid by American railroads in the years from 1880-1887 than in any other comparable period before or since.[23]

Economic recovery also resulted in the company being caught in short supply of appropriate rolling stock. In 1879, they began a large rebuilding program that resulted in substantial output from the Aurora shops over the next year. Eight passenger and 448 freight cars were built, and nearly 500 additional cars were rebuilt. Another 2,200 cars of various types received minor repairs in the shops. In the locomotive department, at least 5 new locomotives were completed and tank frames were constructed for another 19 engines. Over 5,000 car and engine wheels were pressed off and nearly 18,000 were fitted on axles. In 1880, the Aurora shops fitted 50 passenger cars with an improved version of the Westinghouse air brake, and in 1884 150 cars received the newly-introduced Janney coupler. Need for improved service in

hauling fruit long distances resulted in the construction of special cars for this purpose that would run with passenger trains.[24]

This substantial increase in rolling stock, coupled with increasing demands for rail service, necessitated additional and more powerful locomotives, and the company began building and ordering engines in large quantities. Between 1873 and 1893, the CB&Q built approximately 300 locomotives in their own shops and ordered at least that many from outside locomotive works. The Aurora shops built nearly half of these including American type 4-4-0's weighing up to 55 tons, 0-4-0's, and 0-6-0 switchers. The shops also designed and built the CB&Q's first Mogul 2-6-0 locomotives. The locomotive department at Aurora was involved in other types of heavy fabrication needed by the line as well: turntables were constructed here, beginning in 1882, and some bridge girders may have been produced also.[25]

A variety of improvements in the Aurora complex took place at the beginning of this period and planning was begun for a number of others. In 1878 a new coal shed was added to the back of the locomotive department's stationary engine room, improving the efficiency of that operation. That same year the furnace in the blacksmith shop was rebuilt, the stone floor of the locomotive machine shop was re-leveled and repaired, and an oil storage shed was erected for the car department. Major effort was put forth in 1878, also, in remodelling and modernizing the 2 roundhouses. The older roundhouse received a completely new roof including iron trusses and slate covering. Portions of the inside walls were rebuilt and the exterior stone walls were renovated by masons. A new boiler house with a 40' (12.19 m) chimney was added to the newer roundhouse to provide heating for both buildings. Water and sewer systems were also improved with lines being run from the river so that water

could be pumped directly for cleaning purposes. Enlarged drain lines were run to the river also.[26]

The only other major improvements during the period were prompted by fires. On January 24, 1882, a car shed was damaged and a director's car, dining car, 6 passenger cars, several freight cars, and a large quantity of seasoned walnut lumber were burned as well. In December 1886, the wood machine shop of the car department was destroyed by fire, although the Corliss engine in the attached engine house was only slightly damaged. By January 1887, plans were announced for a modern brick replacement for the old machine shop. The new building was 130' by 77' (39.62 m x 23.47 m) with machinery on the first floor and a pattern shop, cabinet shop, and light wood working area on the second floor. Large windows to improve the lighting, a very low pitched roof, and indoor water-closets were believed by the company to be an indication of the modern design of the structure. A final fire, in March 1888, destroyed the paint shop of the car department. Although plans for its reconstruction were discussed in late 1889, the building apparently was not rebuilt until the summer of 1892. The new paint shop was 310' by 148' (94.49 m x 45.11 m) with a cement and gravel roof.[27]

As part of the general upgrading of the roundhouses in 1878, plans were made to rearrange and remodel some of the machine shop and blacksmith areas of the locomotive department. These remodelling plans, developed in the fall of 1878, seem to reflect the company's interests in saving money during the final stages of the national economic depression. It was proposed that the blacksmith shop of the car department be moved to the boiler shop end of the locomotive blacksmith shop, thus consolidating steam hammers, forges, and all blacksmithing work in a single place. The vacated car blacksmith shop was

slated to become a large storehouse, something that was apparently badly needed at the time. The boiler shop would be moved to a new, more convenient, area between the roundhouse and the original machine shop, and car machine shop activities would be located in a new, small, addition between the blacksmsith shop and the original stone machine shop. The remodelling work was budgeted at $15,000, but the company expected to save $500 per month in labor costs as a result of the changes.

The economic recovery that began in early 1879 may have caused company officials to reconsider the shop consolidation plan, as many of the proposed additions to the locomotive shops were not carried out for a number of years. These plans do, however, provide important clues into the operation of both the shops and the railroad, and perhaps most importantly give us an accurate description of the complex at a single point in time. The correspondence outlining the proposed changes and savings are accompanied by a large site plan of the yards measuring approximately 8' by 2'. This extremely valuable document is captured in Photographs HAER IL-8-87/90 and a drawing based upon it is contained in Figure 2.[28]

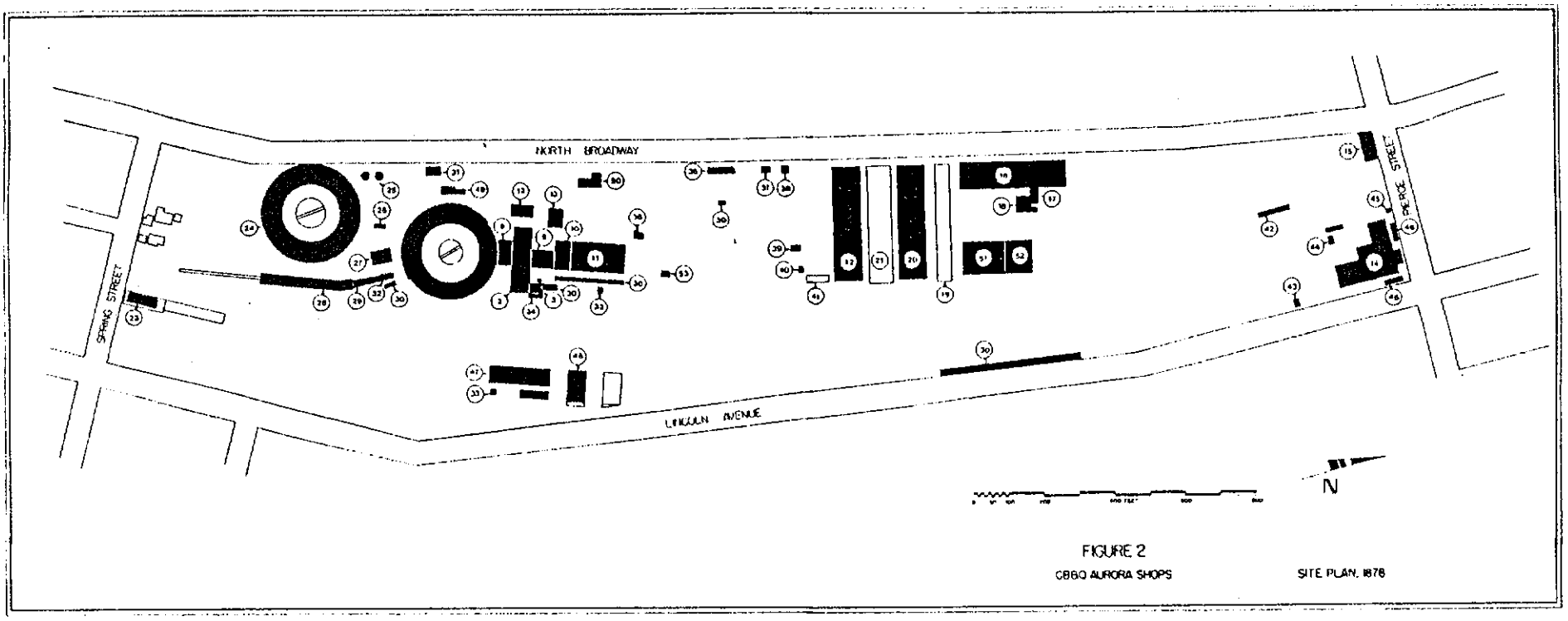

FIGURE 2
CB&Q AURORA SHOPS SITE PLAN, 1878

KEY

1. Roundhouse (1856-1866)
2. Machine Shop (1856)
3. Boiler Room (1856)
8. Erecting Shop (1863)
9. Sheet Iron Work and Heavy Boiler Making Tools (1863)
10. Boiler Shop (1873)
11. Blacksmith Shop (1873)
12. Brass Foundry
13. Tin and Copper Shop
14. Foundry (1871)
15. Pattern House (1872)
16. Wood Machine Shop (1874)
17. Engine House (1874)
18. Boiler House
19. Transfer Table (1874)
20. Car Shop (1874)
21. Transfer Table (1874)
22. Paint Shop and Stove House (1874)
23. Freight House and Platform
24. Roundhouse (1869-1872)
25. Water Tanks
26. Roundhouse Office
27. Oil House
28. Coal Chutes
29. Wood Shed
30. Coal Sheds
31. Office of Superintendent of Locomotive and Car Department
32. Sand Dry House
33. Privey
34. Pattern Shop (1864-65)
35. Upholstery Shop
36. Paint Store House
37. Horse Barn
38. Hair Pickers House
39. Horse Shed
40. Lumber Shop
41. Lumber Office Platform
42. Dry Kiln
43. Horse Stable
44. Foundry Office
45. Watchman's House
46. Sand Shed
47. Carpenters Shop (pre-1873)
48. Hand Car Shop (pre-1873)
49. Locomotive Carpentry Shop
50. Shed for Old Iron (1863)
51. Car Department Blacksmith Shop (1870)
52. Car Department Machine Shop (1870)
53. Scrap Iron Shed

The boom period that had begun in 1879 ended abruptly in 1893 with another major nationwide financial panic and depression. Track construction, locomotive building, and improvements in shop facilities slowed for about 4 years. Prospects brightened in 1897, the company started locomotive building again, and plans were developed to absorb a number of small and medium-sized lines that had been associated with the CB&Q system, but never owned outright. These acquisition plans went forward in 1899 and were finalized in 1900. At the same time, James J. Hill, who already had major interests in the Great Northern and Northern Pacific Railroads decided that direct control of one of the major lines into Chicago was essential for the overall prosperity of his railroad empire. He was not the only one to be interested in the CB&Q, but after several major stock-buying attempts, Hill emerged on top and formally took over the line in May 1901.

Hill's expansive nature influenced the actions of the CB&Q over the next 15 years and more trackage was laid and additional railroads were acquired. In 1908, the CB&Q purchased the 1,900 mile-long Colorado and Southern line giving the company control of the main route from Denver to Houston. Several years later track was laid in Montana and Wyoming, providing a direct link between Great Northern and Northern Pacific lines in the northwest, and CB&Q and Colorado and Southern lines in the Great Basin and Southwest. In 1916, the CB&Q reached its peak mileage with over 9,300 miles of track under its direct control.[29]

The CB&Q increased its rolling stock tremendously during this time period, both by ordering equipment from outside manufacturers and by building cars and locomotives in its own shops. Company shops, however, simply could not produce the numbers of locomotives needed by the CB&Q and other manufacturers

had to be relied upon to produce the majority of the new equipment. The Baldwin and the Brooks locomotive works supplied the CB&Q with over 400 Prairie-type locomotives between 1900 and 1907, and Baldwin built another 281 engines for the line between 1910 and 1917. Between 1895 and 1920, company shops built about 380 locomotives, of which 142 were constructed at Aurora. In June, 1916, the company had 1,753 steam locomotives in operation. Passenger and freight cars continued to be built at company shops, although in 1908, for example, the CB&Q received 1,000 50-ton drop-bottom gondola cars from the Bettendorf Axle Co.[30]

Information on activities at the Aurora shops during the first 2 decades of the twentieth century is sketchy. In addition to the construction of a number of locomotives, an experimental steam motor car was built for the Great Northern in 1906, and the shops tested both passenger train speedometers and track block signalling devices. The car department developed an oxy-acetylene welding procedure to build up the worn parts of car truck pedestals. The cost of the process was reported to be quite small, and amounted to substantial savings over the price of new pedestals. This department also devised a process for reworking old metal roof sheets into a new and improved box car roof design. At this time, the first section of the wheel bay in the locomotive department was enclosed and an addition to the boiler room was completed. A large fire in 1915 destroyed the main storehouse, its contents, and 9 freight cars.[31]

The 1920's saw the American railroad system reach its peak. Major rail expansion did not take place, but it was a period of improvements in track and facilities. Heavier rails were laid along main lines and many bridges were replaced with more substantial spans to accommodate heavier locomotives and

cars. Additions were made to almost every roundhouse on the line; at Aurora, a new roundhouse replaced the second old roundhouse. One of the largest projects at Aurora was the elevation of the main tracks through the city. Discussed as early as 1905, approved in 1914, the massive project was started in 1915 and not completed until 1923. The elevation, promoted by the city and finally accepted by the railroad, did away with 13 street crossings and allowed express-trains a faster passage through the city. A large interlocking tower to control the extensive Aurora yards was erected in 1924, a new coaling station was built in 1921, and a new electric power house was begun in 1922. The most important development during the twenties, however, was a major shift in the activities of the shops.[32]

Expansion of the CB&Q system in Nebraska, Colorado, Wyoming, and other portions of the West brought with it the need for major shop complexes other than Aurora and West Burlington. Shops at Havelock, Nebraska had assumed major responsibility for western repair and construction in the 1890's, but a major shift in facilities occurred in 1924 with the completion of the huge complex at Denver. In addition, the size and weight of many of the newer locomotives exceeded the capacities of older facilities like the original Aurora roundhouse. As a result of these developments, the old locomotive shops at Aurora were converted into a new Manufacturing Department. The last of the engine pits in the old roundhouse were closed in 1925, and the turntable was removed at about this point in time. Most of the roundhouse had been and would continue to be used as a forge shop for producing a wide variety of parts needed in the construction and repair of both locomotives and freight cars. The "manufacturing" nature of the shops is evident in the organization and operation of a rod and valve motion production shop established in 1925 (see

section below). Although the car department produced substantial numbers of freight cars in 1924 and 1925, very few were constructed after 1927. Other CB&Q shops took up the freight car activities and Aurora assumed major responsibility for the construction and repair of passenger cars.[33]

Accompanying these shop rearrangements was a desire by the company to centralize and provide greater control over the enormous quantity of parts that were needed to keep a major railroad running. In 1925 and 1926, the CB&Q built at Aurora what was thought to be the largest railroad storehouse in the United States at a cost of over $400,000. Floors of the building were connected by ramps, not elevators, and a huge outside overhead crane connected the storehouse with a multiple-track siding. The layout of the complex in the mid-1920's is shown in Figure 3.[34]

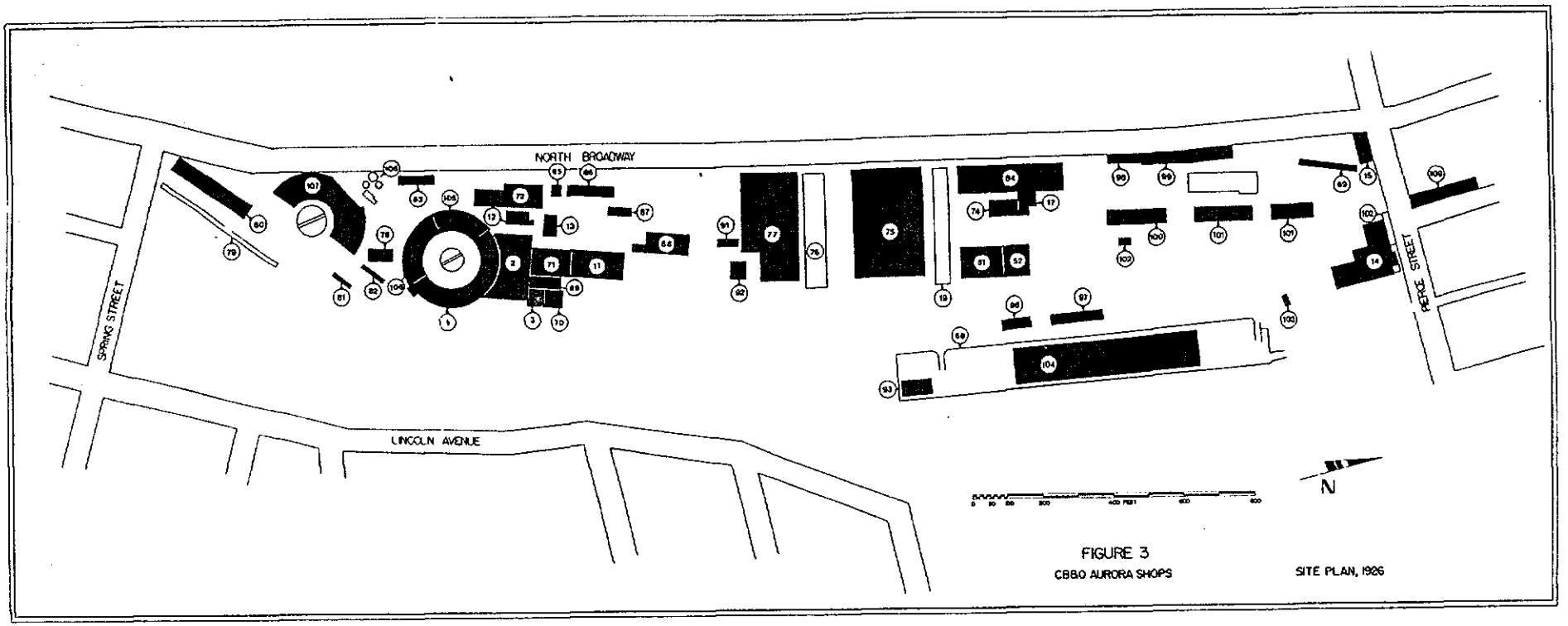

FIGURE 3
CB&Q AURORA SHOPS
SITE PLAN, 1926

KEY

1. Forge Shop (1856)
2. Machine Shop (1856-1908)
3. Engine Room (1856-1908)
11. Blacksmith Shop (1873)
12. Washroom and Pattern Store
13. Scale Shop and Office (pre-1878)
14. Foundry (1871)
15. Pattern House (1872)
17. Tin Shop (1874)
19. Transfer Table (1874)
51. Truck Shop (1870)
52. Machine Shop (1870)
68. Concrete Platform (1926)
69. Lumber Storage
70. Boiler Room (pre-1908)
71. Rod Shop (1898-1908)
72. Brass Foundry
74. Boiler Room
75. Coach Shop
76. Transfer Table
77. Paint Shop (1892)
78. Roundhouse Office
79. Freight House Platform
80. Freight House and Office
81. Sand House
82. Coal Chute
83. Office of Shop Superintendent
84. Wood Mill (1887)
85. Scrap Iron
86. Scrap Brass
87. Oxygraph Cutting
88. Spring Shop
89. Wheel Bay (1908-1923)
91. Locker Room
92. Electric Shop
93. Oil Store
96. Garage
97. Coal, Coke Storage
98. Dry Kiln
99. Lumber Shed
100. Welding Shop
101. Motor Car Shop
102. Sand Storage
103. Storage Shed
104. Store House (1926)
105. Roundhouse Boiler Shop (1859)
106. Roundhouse Cab Shop (1866)
107. Roundhouse (1925)
108. Water Tanks
109. Carpenters Shop

The depression of the 1930's forced additional reorganization of the shop complexes: the Plattsmouth car shop closed completely and locomotive work at Havelock was transferred to Denver and West Burlington. Aurora does not seem to have "lost" any activities at this time and may have gained in some of the consolidation moves. Air brake repairs were centralized here and in Havelock in 1932, and Aurora assumed responsibility for all air compressor work on the system that same year. Following development of the streamlined Zephyrs in the early 1930's, all wheel and axle work for these units was done at Aurora. Despite these activities, the lean years can best be demonstrated by noting that in 1932 only 5 cars were constructed for the CB&Q--all at Aurora. Passenger car building and rebuilding did go on at the Aurora shops during this period. Air-conditioning was added to cars, and a variety of suburban coaches, smoking cars, baggage and dining cars were built. The only major alteration to the shops was the replacement of the coach shop, which was destroyed by fire in September 1931.[35]

By 1940, the economy had improved and construction of cars and locomotives was again occurring in company shops. The war economy provided an additional boost to railroad prosperity, but when the war ended the railroads had to adjust to rising labor costs, stiff competition from other forms of transportation, and automation in many of the shop and running trades. The Aurora shops continued to concentrate their efforts in manufacturing parts for the entire system and in the building and repairing of passenger train equipment. The major decline in railroad service, particularly in the passenger areas forced the company to close the Aurora complex in 1974. Demolition permits were issued in 1975 and 1976, and all buildings except the original roundhouse and back shops were taken down. A final drawing of the

complex as it existed in the 1940's and 1950's is contained in Figure 4. (See also Photographs HAER IL-8-85 and 86)

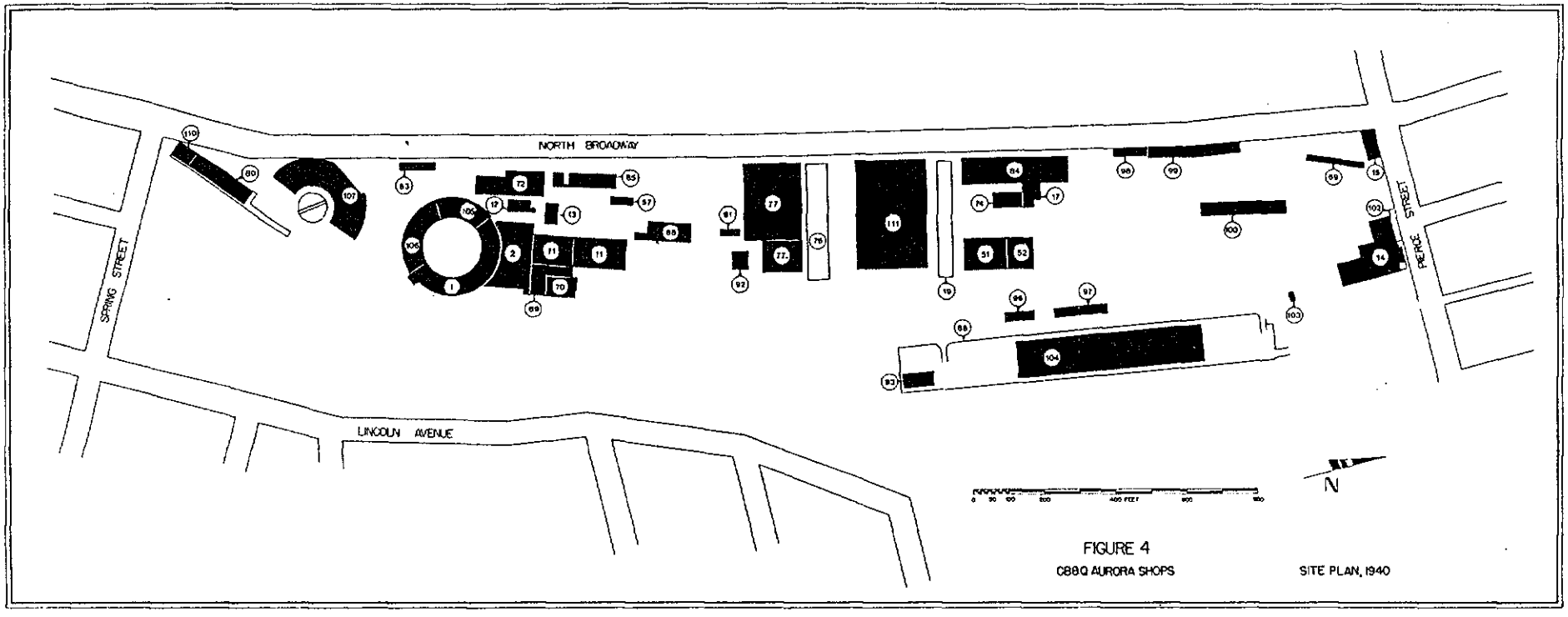

FIGURE 4
CB&Q AURORA SHOPS SITE PLAN, 1940

KEY

1. Forge Shop (1856)
2. Machine Shop (1856-1908)
11. Blacksmith Shop (1873)
12. Washroom and Pattern Store House
13. Scale Shop and Office (pre-1878)
14. Foundry (1871)
15. Pattern House (1872)
17. Steel and Tin Shop (1874)
19. Transfer Table (1874)
51. Pipe and Truck Shop (1870)
52. Brass Finishing and Plating Shop (1870)
69. Lumber Storage
70. Tool Room (1900-1940)
71. Rod Shop (1898-1908)
72. Brass Foundry
74. Power Plant
76. Transfer Table
77. Paint Shop (1892)
77A. Electric Shop (1892)
80. Freight House
83. Office of Shop Superintendent
84. Wood Mill (1887)
85. Scrap Iron and Brass
87. Oxygraph Cutting Shop
88. Spring Shop
89. Wheel Bay (1908-1923)
91. Locker Room
92. Electric Shop
93. Oil Store House
96. Garage
97. Fuel Storage
98. Dry Kiln
99. Lumber Shed
100. Welding, Motor Car Shop
102. Sand Storage
103. Acetylene Generating Plant
104. Store House
105. Tank Shop (1859)
106. Drilling and Threading Run (1866)
107. Roundhouse (1925)
108. Water Tanks
110. Freight House Office
111. Coach Shop (1932)

AURORA AND THE OTHER SHOPS: A COMPARISON

The contribution made by the Aurora shops to the operation of the CB&Q can not be over-emphasized, although they were only one part of a large network of minor and major facilities that serviced the railroad for 130 years. Dozens of minor maintenance facilities were constructed at terminal and division points on the road, including Chicago, Beardstown, Eola, Centralia, Mendota, Rock Island, and Quincy (Illinois); Red Cloud, McCook, and Alliance (Nebraska); and Casper, Wyoming. In addition, several slightly larger facilities were operated at various times by the CB&Q and its affiliated railroads. The shops at Hannibal and St. Joseph, Missouri, for example, were inherited when the system took over the Hannibal and St. Joseph and the Kansas City, St. Joseph and Council Bluffs Railroads. Both of these shops built and repaired locomotives for their respective systems prior to their mergers with the CB&Q.[36]

Major construction and repair of locomotives and cars as well as the general organization of employees in shop and running trades was centered around an organizational unit called a "division." Exactly how these divisions were defined before 1881 is unclear, but in that year the CB&Q had 4 divisions: Chicago, Galesburg, St. Louis, and Iowa. The central shops of the Chicago division were those in Aurora, the Galesburg shops handled the Galesburg Division, and the Iowa Division included shops at both Burlington and Creston. The St. Louis Division is probably what later became known as the Hannibal Division with shops concentrated in the city with the same name.[37] In 1883, 2 additional divisions were established at Red Cloud and

McCook to handle the expanding western roads of the campany.[38] Further divisions were added as the railroad expanded and traffic increased, so that by 1922 there were twenty-two.[39]

Despite the increase in the number of divisions, 6 major shop facilities dominated the CB&Q during most of its history. These included the Aurora facilities as well as the shops at Galesburg, West Burlington, Creston, Havelock, and Denver.

Galesburg

Facilities for the construction and repair of cars were established in Galesburg by 1858, and a machine shop was in operation by early 1862. In 1863 "substantial and commodius shops" were erected and an engine house was constructed.[40] Nearly 450 employees worked for the locomotive department in 1875, and a few years later these shops were responsible for the operation and maintenance of 84 locomotives.[41] Locomotive repair and construction continued until the late 1880's when reports suggest a reduction in shop activities.[42] Some type of locomotive servicing did continue, however, and new water works were added in 1901 and a new 16-stall roundhouse built in 1920.[43] During this same time period, track and roadbed maintenance for the eastern divisions of the line may have been concentrated here as evidenced by the construction of a tie-treating plant about 1908.[44]

Car repair, which had been an early specialization at the Galesburg shops, was revived there in 1924 with the construction of facilities to repair steel cars. Following this the shops concentrated on the building of freight cars--1200 being constructed there in 1925 and 2000 in 1927. Car handling and

servicing continued to be the major function with improvements being made to the classification yards in 1930 and again between 1942 and 1946.[45]

Burlington

The principal shops of the Burlington and Missouri River Railroad located in Burlington, Iowa, became part of the CB&Q system with the take over of that road in 1872. A roundhouse was certainly there by the late 1860's and grain and merchandise cars were being built in 1873.[46] Three-hundred and sixty-four (364) employees were attached to the Burlington Locomotive Department, and along with a similar number of workers in Creston, had 140 locomotives under their care in the late 1870's.[47] By 1880, however, it was apparent that these facilities would need to be improved to handle the increase in activities on western roads of the system. New shops were begun in 1881 on a large tract of land located to the west of the town of Burlington. These new $500,000 West Burlington shops immediately became a part of a major locomotive building program of the CB&Q in the late 1880's.[48] A variety of switcher and mainline locomotives were built there through about 1910. The heavier locomotives required improved facilities for their repair and in 1916-17 new locomotive repair and machine shops were constructed in West Burlington at a cost of $1.5 million.[49] The improved facilities allowed these shops to handle some of the heaviest locomotives on the system, including the 225-ton Northern class 4-8-4's built there in the late 1930's.[50]

Like the other major shops, West Burlington was involved in the building and repair of cars at various points in its history. The Plattsmouth and West

Burlington car shops built a total of 350 cars in 1925 and after that date West Burlington's output was primarily in flat and refrigerator cars. All gas and electric motorized cars in the system were repaired in West Burlington after 1931.[51]

Creston

A division point was established at Creston, Iowa, in the early 1870's at about the same time the CB&Q took over the Burlington and Missouri River Railroad. Tools and machinery at the old CB&Q locomotive shop at Quincy were moved to Creston following the merger, and in the 1870's and 1880's it shared with Burlington the locomotive repair activities of the Iowa division. In 1875 these 2 Iowa division shops had nearly the same number of employees in their locomotive departments and repair records seem to indicate equal levels of activity. With the building of the new West Burlington shops in 1881-82, Creston's contributions to the system were overshadowed by these larger facilities to the east. Some improvements were made to the complex in 1884 and 1903. Records do not indicate that any locomotives were ever built here, but four 4-4-0's were rebuilt as heavier engines in 1916 and 1917. No major car repair activities were ever located at Creston.[52]

Havelock

Track construction in the 15 years following the Civil War proceeded at an extraordinary pace resulting in rail service to Denver by 1882. Repair facilities had not, however, kept abreast of these developments, and until 1890

the western-most shops were located at Creston and Plattsmouth on the Missouri. In that year the CB&Q started construction of new locomotive shops at Havelock, near Lincoln, Nebraska. Costing over $200,000 these shops greatly increased the company's ability to service its western roads and provided additional facilities for locomotive construction. Between 1895 and 1918, these shops built 39 4-4-2's and 31 switchers, and rebuilt another 40 engines. The shops were greatly expanded in 1910, but during the early years of the Depression the locomotive shops were converted to a freight car repair facility.[53]

Denver

The final set of shops to be established by the CB&Q were those constructed at Denver in 1922 and 1923. These new locomotive shops were located on a 280-acre site in buildings that cost $2.5 million and were to employ 1,000 men. They were designed to service locomotives on the western lines of the system which had previously returned to Havelock for major repairs. New terminals to handle diesel locomotives and special facilities for the Zephyrs were added to this complex as late as 1957.[54]

The 5 shops described above and the Aurora facility can be compared in more specific terms by examining the size and output of the facilities at various points in time. The data assembled in Table 1 suggest that the Aurora shop was both the largest and the most productive during the nineteenth century. Thirty-three (33) percent of the locomotive department employees of

the CB&Q were stationed in Aurora in 1875 while Galesburg, Creston, and Burlington had 21% to 25% each. More steam locomotives were constructed in Aurora than in any other shop, although by the early twentieth century West Burlington, Havelock, and Aurora were building engines in approximately equal numbers. Freight car construction data for the 1920's shows the predominance of the new Galesburg shops in this area, although Aurora produced a wide variety of passenger train cars during the 1930's. The position of Aurora relative to other locomotive shops changed in the late 1920's with West Burlington and Denver assuming the major role in repairs.

Table 1
Proportion of Units at Each Shop

	Aur.	Gals.	Burl.	Crstn	Havik	Total
shop materials, 1858	73%	27%				$57,000
shop materials, 1862	64%	36%				$32,300
Loco's. assigned to, 1868	49%	51%[a]				122
grain car constr, 1875	50%	----50%----				100
Loco. Dept. employees, 1875	33%	25%	21%	21%		1768
Loco's. assigned to, 1881	30%	26%	----44%----			320
Major loco. rebuilds to 1899	62%	15%	23%			13[b]
Loco. constr. (1868-1882)	45%	15%	2%			61
Loco. constr. (1883-1894)	46%	2%	25%			236
Loco. constr. (1895-1940)	35%		30%		28%	410
Freight car constr., 1925	37%	49%	14%[c]			2450
Freight car constr., 1927	2%	98%				2040

[a] includes Quincy shops
[b] approximately 10% sample
[c] includes cars built at Plattsmouth

Each of the shops made unique contributions to the CB&Q and to railway development in general. Aurora built the first Pullman diner, The Delmonico, in 1869, experimented with early steam motor cars about 1906, and developed new box car roofing techniques during the First World War. Aurora and West Burlington built the first Mogul locomotives for the line in 1888 before dozens were ordered from major locomotive manufacturers. Similarly, West Burlington pioneered the development of the popular Prairie-class locomotive prior to the construction of hundreds of these units by Baldwin and Brooks. Special tools for wheel and axle repair were designed in the West Burlington shops about 1910 and Aurora and Havelock developed special shops for air-brake repairs in the 1930's. Machinists and foreman in the CB&Q shops reported numerous innovative repair procedures and new specialty tools to technical journals during the early twentieth century; up to 1930 they came primarily from West Burlington and after that date from the Denver shops.[55]

THE RAILROAD SHOPS AND THE LOCAL COMMUNITY

The word "railroad town" has been commonly used to refer to towns and cities whose economy was or was thought to be totally dominated by major railroad facilities or headquarters. Aurora might have been called such a town in the nineteenth century, yet even then it would have differred greatly from some railroad communities of the midwest. These towns, particularly those in western Iowa or in Nebraska, were founded after or as the railroad came through, and from the beginning the railroad's influence in all aspects of community life was predominant. Another group of railroad towns, of which

Aurora seems to belong, were established before the coming of the railroads, and therefore, the relationship between community and company was very different from the beginning. Aurora was a "market town" that became a "railroad town"; Creston, Iowa, and McCook, Nebraska, on the other hand, were very much towns established by the railroads.[56]

When the Aurora Branch Railroad was first established in 1849, Aurora was already a modest market center for the agricultural areas west of Chicago. It had a population of something over 1,000, and included a number of permanent commercial and residential buildings, as well as several large grist mills. The earliest settlement was on the east side of the Fox River, and therefore, when the railroad needed to establish its first depots and shops, land had to be purchased from private owners.

The railroad either owned or leased land as early as 1850, when it established a temporary terminal building near the area where the present shops are located. Some property was acquired in 1854, but major acquisition of land for the shops occurred in the fall of 1855. The railroad had hoped that they could acquire the necessary land without cost, but were forced to adopt condemnation procedures and attempt to arrange appropriate compensation with each landowner. When these tactics failed, the company went to court to have an official compensation commission established and to uphold the railroad's right to use the condemnation procedures. The State Supreme Court upheld their actions and established a legal precedent that railroads could condemn land for these purposes. The amount of property acquired by these means may have been about 30 acres and constitutes the land located at the south end of the present site.[57]

A major confrontation occurred in 1867 between land owners, businessmen, and railroad officials. In that year, the CB&Q decided to expand its shop facilities. The Aurora site, however, afforded no room for expansion as the complex was surrounded by privately owned residential and commercial property. Land in Chicago seemed to be more promising and it was rumored that landowners there were prepared to give them buildings for 10 years. Consequently, a mass meeting was held on March 9, 1867, to determine what the town should do. Community leaders agreed that action had to be taken to keep the shops in Aurora, and in subsequent meetings with company officials and landowners it was determined that about $69,000 would be needed to secure the land. The company would pay no more than $500 per acre for the desired additional 30 acre tract, thus leaving a substantial amount for the city to raise. To complicate matters further, citizens on the west side of the river argued that the shops were of greater benefit to those on the east side, and therefore, that section of the city should have to assume the financial burden. Ultimately, 2 bond issues totaling $62,000 were raised, the properties acquired and cleared by the town, and the land turned over to the railroad. The town was still trying to retire the indebtedness as late as 1869, and at least 1 disgruntled landowner was still angry at the railroad in 1873. The land acquired in this transaction was predominantly north of the original site, although some property on the south side of the site along Broadway Street may have also been involved.[58]

When the citizens of Aurora voted in 1867 to assume substantial financial responsibilities to maintain the shops, they did so with the knowledge that the railroad was essential to the prosperity of the town. They probably knew what we can only estimate now that about 30% of the workforce of Aurora was

employed by the railroad. That percentage had probably grown from about 20% when the shops first opened in 1856, and may have reached a high of nearly 50% in the 1870's and 1880's. By 1900, it would have been back down to the earlier levels, and by 1940 would have been only about 5% of the workforce in Aurora. Table 2 represents an attempt to chart the growth and decline of the workforce at the shops based upon the limited data gathered for this report.[59]

Table 2
Shop Employees, 1857-1940

Date	Shop Employees Only	Shop & Trainmen
1857		335-350
1858	200	270-300
1861		750
1863	604	695
1868	784	970
1871		1,500
1872		1,985
1876	580	
1878		1,123
1884		1,500
1940	500	

The table also shows the effect of the depression of the 1870's: employment had grown to nearly 2,000 just before the panic, dropped to 1,100 in the middle of the depression, and was only back up to 1,500 by 1884. Although data is not available for the Aurora shops, the company reduced the workforce by 25% nation-wide during the depression of the 1890's. The 1940 figure represents a workforce just barely on the way out of a long depression and not yet affected by the war-time economic boom.

A depressed economy not only brought about layoffs, but those who remained on the job frequently had their wages reduced. In the fall of 1876 a proposal was put forward and probably carried out to reduce wages of employees at the shops in Aurora. Blacksmiths and machinists were reduced from $2.70 per day to $2.45, while common laborers went from $1.20 to $1.10. Pay reductions were common in the nineteenth and early twentieth centuries, although unionization eventually produced minimum wages among some employees. A labor dispute in 1913-1914 resulted in the establishment of a minimum wage for trainmen, the first such occurrence in the United States for this category of worker. Shopmen did not unionize until 1918, and in 1922 signed a major wage agreement following a strike. Although many CB&Q employees struck during the nation-wide strike in 1877, employees in Aurora remained on the job. The strike in 1888 involved trainmen stationed at Aurora, but again did not directly involve those working in the shops.[60]

The CB&Q roundhouse and backshop complex in Aurora, Illinois, are all that presently remain of what once was one of the midwest's largest railroad shop facilities. In the era of steam these were the major repair and construction

shops for the CB&Q, employing as many as 2,000 workmen in periods of peak operation. During the twentieth century, changes from the construction and repair of steam locomotives to the construction of streamlined passenger cars paralleled developments throughout the railroad industry. When the shops closed in 1974, that too was indicative of both technological advance and the position of railroads in the American economy.

FOOTNOTES

[1]These statements are based upon descriptions of comparable structures listed in Historic American Engineering Record Catalog 1976 (Washington, D.C.: National Park Service, 1976), pp. 13, 113-115, 169, 171-173.

[2]Robert R. Russel, A History of the American Economic System (New York: Appleton-Century, 1964), pp. 154-170, 309-323; Shelton Stromquist, A Generation of Boomers: The Pattern of Railroad Labor Conflict in Nineteenth Century America (Urbana: University of Illinois Press, forthcoming, 1984), Chapter 1. Our appreciation is extended to the author for allowing us to examine the manuscript of this important forthcoming work which describes CB&Q workers in the communities of Creston and Burlington during the period of labor unrest in the late 19th century.

[3]The general history of the CB&Q reported here and in subsequent paragraphs is taken from Richard C. Overton, Burlington Route (New York: Alfred A. Knopf, 1965).. The details on the evolution of the Aurora site have been filled in with additional research that followed the broad outlines sketched in Historic American Engineering Record, untitled report (1977); "Aurora Roundhouse Complex Transportation Center Rehabilitation Feasibility Study" (Chicago: Murphy Engineering Inc., August 1980); Aurora Preservation Commission, "History of Structures in the Chicago, Burlington and Quincy Railroad Complex" (February 19, 1982); and "Roundhouse Complex, Aurora, Illinois, Historic Structures Report, Draft 1" (Harry Weese & Associates, Ltd., April 1, 1983). Of these the initial HAER report and the report by the Aurora Preservation Commission were the most helpful. In addition, preliminary research in local newspapers and in the CB&Q Papers (Newberry Library) by Patricia Casler of the Aurora Preservation Commission laid important groundwork upon which this present report is based.

[4]Annual Report of the Chicago, Burlington and Quincy Railroad (February 1856); and American Railroad Journal, 29 (April 26, 1856): 260.

[5]Aurora Beacon 14 September 1855. Several reports of activity related to the construction of the shops are found in two undated fragments of the Aurora Beacon, in the collections of the Aurora Historical Society. Although presently filed with copies of the paper from the summer of 1855, it is more likely that they were published late in November, 1855, or sometime the following spring.

[6]Aurora Beacon 7 December 1855.

[7]Aurora Guardian 17 July 1856; and Annual Report (June 1856), pp. 7-8.

[8]This description is from the Aurora Daily News 23 October 1856. Several other descriptions of the initial complex, including some with different sets of building dimensions, are found in The Chicago Magazine, 1 (1857): 251-252; Ferslew's Kane County Gazetteer 1857 (Geneva, Ill., 1857);

and Aurora City Directory and Business Advertiser for 1858 and 1859 (Aurora: A.O. Bingham, 1858), pp. 115-116.

[9]This lithograph is undated; the "1859" has been added with pen at a later date. A map of Aurora, dated 1860, confirms the lithographic view of the complex; see Kane County Map, 1860 (Matthews, Crane, and Co., 1860) in the possession of the Aurora Historical Society.

[10]American Railroad Journal, 34 (October 19, 1861): 730-732; 32 (July 30, 1859): 483; Annual Report (June 1858), p. 22; and (June 1859), p. 12.

[11]American Railroad Journal 36 (June 27, 1863): 616; and (August 22, 1863): 783.

[12]Annual Report (June 1861), pp. 11, 31, 33; (June 1862), pp. 32, 43, 45; and (June 1863), pp. 11, 31.

[13]Aurora Beacon December [24] 1863. Most writers have dated this fire as Christmas Day, 1863, although again the fragmentary nature of surviving issues makes this difficult to determine. Internal evidence in this issue suggests a publication date of December 24, and therefore the fire would have occurred on December 18.

[14]Annual Report (June 1865), pp. 28-30; and (June 1866), pp. 29, 34, 35.

[15]Overton, pp. 105-115; and Railroad Gazette (October 28, 1871): 309.

[16]Bernard Corbin and William Kerka, Steam Locomotives of the Burlington Route (New York: Bonanza Books, 1978), pp. 254-255; A.W. Newton, "Motive Power of the CB&Q, as of May 1, 1858," Railroad History (No. 92, April 1955): 83-88; Aurora Beacon News 28 March 1867 and 28 November 1867; Railroad Gazette (November 25, 1871): 355; (December 2, 1871): 367; (June 29, 1872): 276; Annual Report (June 1868), p. 38; (June 1869), pp. 14, 41, 42-43; (June 1870), p. 43; (June 1872), p. 22, 52; (June 1873), p. 45.

[17]Overton, pp. 44, 51, 69; Annual Report (June 1869), p. 43. See 35 mm photo H1-2A; the chutes can also be seen at the left in photo HAER IL-8-79.

[18]Annual Report (June 1872), p. 52; and William B. Strong to C.E. Perkins, May 5, 1876. Chicago, Burlington and Quincy Railroad Papers 33 1870 5.2, Newberry Library.

[19]Overton, pp. 52, 96; John H. White, Jr., The American Railroad Passenger Car (Baltimore: The Johns Hopkins University Press, 1978), p. 252; Railroad Gazette (November 4, 1871): 321; (February 24, 1872): 88; and (May 3, 1873): 181.

[20]Annual Report (June 1869), p. 43; (June 1870), p. 43; (June 1871), p. 39; (June 1872), p. 52; and (June 1873), p. 45.

[21]Railroad Gazette (April 13, 1872): 163; (May 24, 1873): 212; Annual Report (February 1874), pp. 12, 36; and see the very detailed article on the fire, including a map of the complex showing buildings burned, in Aurora Beacon 21 May 1873.

[22]Aurora Beacon 21 & 28 May, 14 & 18 June, 9 July, 10 & 25 October 1873; Railroad Gazette (May 31, 1873): 222; (July 5, 1873): 274; (July 26, 1873): 303; (August 23, 1873): 343; (November 22, 1873): 471; (November 29, 1873): 479; (December 13, 1873): 495; Annual Report (February 1874), pp. 12, 36, 41, 42, 43; (February 1875), p. 52.

[23]Overton, pp. 176-198; Railroad Gazette 10 (March 15, 1878): 143.

[24]Railroad Gazette 12 (February 6, 1880): 83; (September 24, 1880): 511; 16 (December 5, 1884 875; Railway Review 26 (January 16, 1886): 31; and Railroad and Engineering Journal 61 (No. 6, June 1887): 288.

[25]Corbin and Kerka, pp. 256-291; Railroad Gazette 13 (July 29, 1881): 420; Railway Review 23 (November 24, 1883): 693; 27 (February 5, 1887): 76; (December 10, 1887): 706; 30 (February 15, 1890): 87; and Railway Track and Structures 33 (May 1937): 344-347. Locomotives are classified and commonly referred to according to their wheel arrangement: the first figure refers to the number of wheels in the leading truck, the second figure the number of driver wheels, and the third figure the number of wheels in the trailing truck. The classification system was devised by Frederic M. Whyte in 1900. Names like American and Mogul were informally applied to the different wheel arrangements.

[26]Aurora Beacon 5 January; 23 March; 18 May; 15, 22, 29 June; 27 July; 10, 24, 31 August; 7 & 28 September; 12 & 26 October; 2, 16, 20 November; and 7 December 1878.

[27]Railroad Gazette 14 (February 3, 1882): 79; Aurora Beacon 15 December 1886; 31 March 1888; 28 December 1889; 23 May 1892; 7 June 1892; Railway Review (January 1, 1887);and CB&Q Papers 33 1890 5.1. The new machine shop can be seen in photograph HAER IL-11-83.

[28]Geo. Chalender to T.J. Potter, General Supt., October 17, October 22, October 24, 1878; T.J. Potter to C.E. Perkins, Vice Pres., November 9, 1878; "Cost Estimates....", October 12, 1878, accompanied Chalender letter of October 17; and "Aurora Shops" [yard plan], undated, which also accompanied letter of October 17, 1878, CB&Q Papers 33 1870 8.13.

[29]Russel, p. 318; and Overton, pp. 244-263, 267-292.

[30]Corbin and Kerka, pp. 256-291; Railway and Engineering Review 43 (February 28, 1903): 146-147; Railway Review 48 (June 6, 1908): 448-449; 51 (May 31, 1911): 418-419; 57 (April 13, 1912): 334-337, 342; 61 (September 1, 1917): 253-255; and Annual Report (December 1916), p. 13.

[31]Railway and Engineering Review 46 (March 24, 1906): 225; (June 30, 1906): 483; 47 (August 31, 1907): 759; (November 23, 1907): 1003; Railway

Mechanical Engineer 90 (No. 2, 1916): 75, 82; and H.W. Weiss to E.H. Byran, June 19, 1916, CB&Q Papers 33 1890 5.3.

[32]Overton, p. 340; Railway Track and Structures 18 (April 1922): 153; 19 (April 1923): 176; 20 (June 1924): 254; Aurora Beacon News 15 October 1922; Railway Review 66 (March 13, 1920): 405-409; 71 (September 23, 1922): 414-415; Annual Report (December 1921), p. 21; and (December 1923), p. 22-25.

[33]Overton, pp. 338, 342; Aurora Beacon News 16 August 1926; 22 January 1928; Annual Report (December 1924), p. 23; (December 1925), p. 24; (December 1927), pp. 24-25; Railway Mechanical Engineer 99 (May 1925): 284-287; (June 1925): 351-354; and "Souvenir Programme 90th Anniversary Celebration of Railroad Service between Chicago and Aurora" (Aurora Chamber of Commerce, 1940).

[34]Annual Report (December 1925), p. 21; and Railway Review 78 (January 23, 1926): 179-184. This article has a site plan, photos, and diagrams of the new storehouse.

[35]Annual Report (December 1931), p. 6, 12; (December 1932), p. 12; Railway Mechanical Engineer 106 (August 1932): 335-337; 107 (February 1933): 65-67; and 111 (February 1937): 81-82.

[36]Corbin and Kerka, pp. 256-261.

[37]Railway Age 6 (May 19, 1881): 275.

[38]Overton, p. 186.

[39]Railway Review 71 (August 26, 1922): 274. See also the division lists for 1935 and 1952 in Corbin and Kerka, pp. 292-293.

[40]American Railroad Journal 31 (July 31, 1858): 484; 36 (August 27, 1863): 783; Annual Report (April 30, 1862), p. 31.

[41]Railroad Gazette 7 (June 19, 1875): 261; and Railway Age 6 (May 19, 1881): 275.

[42]In 1885 the last locomotive was constructed at Galesburg and locomotive repairs seem to have ended about 1889. Construction data was compiled from a roster of steam locomotives that existed in 1904 and a complete list of those built in subsequent years--see Corbin and Kerka, pp. 256-291. A notice in Railway Review suggests that the company planned to move some of the Galesburg shop activities to Aurora about this time--see (July 28, 1887): 432. Repair data is found in Engine Repair Records, 6 volumes (1864-1902), CB&Q Papers 33 1860 2.2.

[43]Annual Report (1901), p. 14; and Railway Track and Structures 16 (September 1920): 367.

[44]Overton, pp. 281, 360-361. The timber-treating plant was enlarged again in 1957.

[45]Overton, pp. 339, 342, 364, 409, 493; Annual Report (1925), pp. 24-25; and Annual Report (1927), p. 24.

[46]Overton, pp. 107, 111; Railroad Gazette 5 (May 3, 1873): 181.

[47]Railroad Gazette 7 (June 19, 1875): 261; and Railway Age 6 (May 19, 1881): 275.

[48]Railroad Gazette 12 (September 24, 1880): 511; 13 (March 25, 1881): 174; Annual Report (1881), p. 13; (1882), p. 12; and (1883), p. 12.

[49]Annual Report (June 1916), p. 16.

[50]Corbin and Kerka, p. 290.

[51]Overton, p. 342; Annual Report (December 1925), p.24; and Railway Mechanical Engineer 105 (March 1931): 129-134.

[52]Annual Report (1884), p. 13; (1903), p. 14; Railroad Gazette 5 (June 28, 1873): 265; 7 (June 19, 1875): 261; Corbin and Kerka, pp. 256-291; Engine Repair Records, CB&Q Papers 33 1860 2.2; Stromquist, A Generation of Boomers, Chapters 2 and 3.

[53]Annual Report (1890), p.12; (1891), p. 12; (1892), p. 12; (1910), p. 5; (1931), p. 6; and Corbin and Kerka, pp. 256-291. A detailed account of the 1910 expansion, including a site plan, is found in Railway Review 50 (December 31, 1910): 1187-1191.

[54]Overton, pp. 360-361. Two detailed descriptions of the Denver shops are found in Railway Review 71 (November 4, 1922): 611-613; and 74 (January 5, 1924): 64-73.

[55]White, Passenger Car, pp. 316-317; Railway Review 46 (June 30, 1906): 483; 50 (October 22, 1910): 990-991; Railway Mechanical Engineer 90 (No. 2, 1916): 75; 106 (August 1932): 335-337. Technical reports from the journal, The Railway Mechanical Engineer, were examined for the years 1916 through 1939.

[56]Stromquist, A Generation of Boomers, Chapter 3.

[57]Kane County Deed Book, Aurora, April 12, 1854, Box 33, p. 203; Overton, p. 45.

[58]Aurora City Gazetteer (Knickerbocker and Hodder, 1868), pp. 14-15; Aurora Beacon News 28 March; 4 April; 28 November; 5 December 1867; 9 January 1868; 15 September 1869; and May 1873.

[59]Sources for Table 2 include: Ferslew's Kane County Gazetteer 1857; Aurora City Director (1858), pp. 115-116; "Complete Roster of CB&Q Shop

Employees, 1863," CB&Q Files, Aurora Historical Society; Aurora City Directory (1868); Railroad Gazette (October 28, 1871): 308-309; (March 9, 1872): 105; (June 19, 1875): 261; (November 22, 1878): 570; (December 5, 1884): 875; and "Souvenir Programme" (1940).

[60]"List of Men in Car Dept. East Division, August 1876", "List of painters and laborers employed in Aurora Paint Shop," "Aurora Locomotive Dept," CB&Q Papers 33 1870 3.3; Railroad Gazette (June 29, 1877): 296; (August 3, 1877): 354; Annual Report (December 1894), p. 14; Railway Review 53 (August 30, 1913): 816; 54 (Februrary 21, 1914): 278-279; 63 (August 24, 1918): 292; and 71 (September 23, 1922): 425.

PART II

ARCHITECTURAL AND ENGINEERING DESCRIPTION

Tracing the physical and mechanical evolution of the roundhouse and back shop complex is an integral part of this HAER study. Contemporary and historic photographs as well as a series of historic site plans provided essential information upon which this description is based. Additional material from contemporary newspapers and railroad journals provided insights into the original dimensions, materials, construction techniques, and functions of each structure. In addition to the written descriptions provided below, these developments are illustrated through a series of axiometric diagrams which portray the complex at five points in time.

BUILDING IDENTIFICATION PLAN

The 10 interconnected structures which comprise the extant complex have been identified in two ways. First, the portions of the roundhouse are identified according to the year in which the portion was completed (see Figure 5). Second, each building in the backshop complex has been given a name that reflects the longest standing historic function of the structure. Dotted lines in Figure 5 represent original walls that have since been removed.

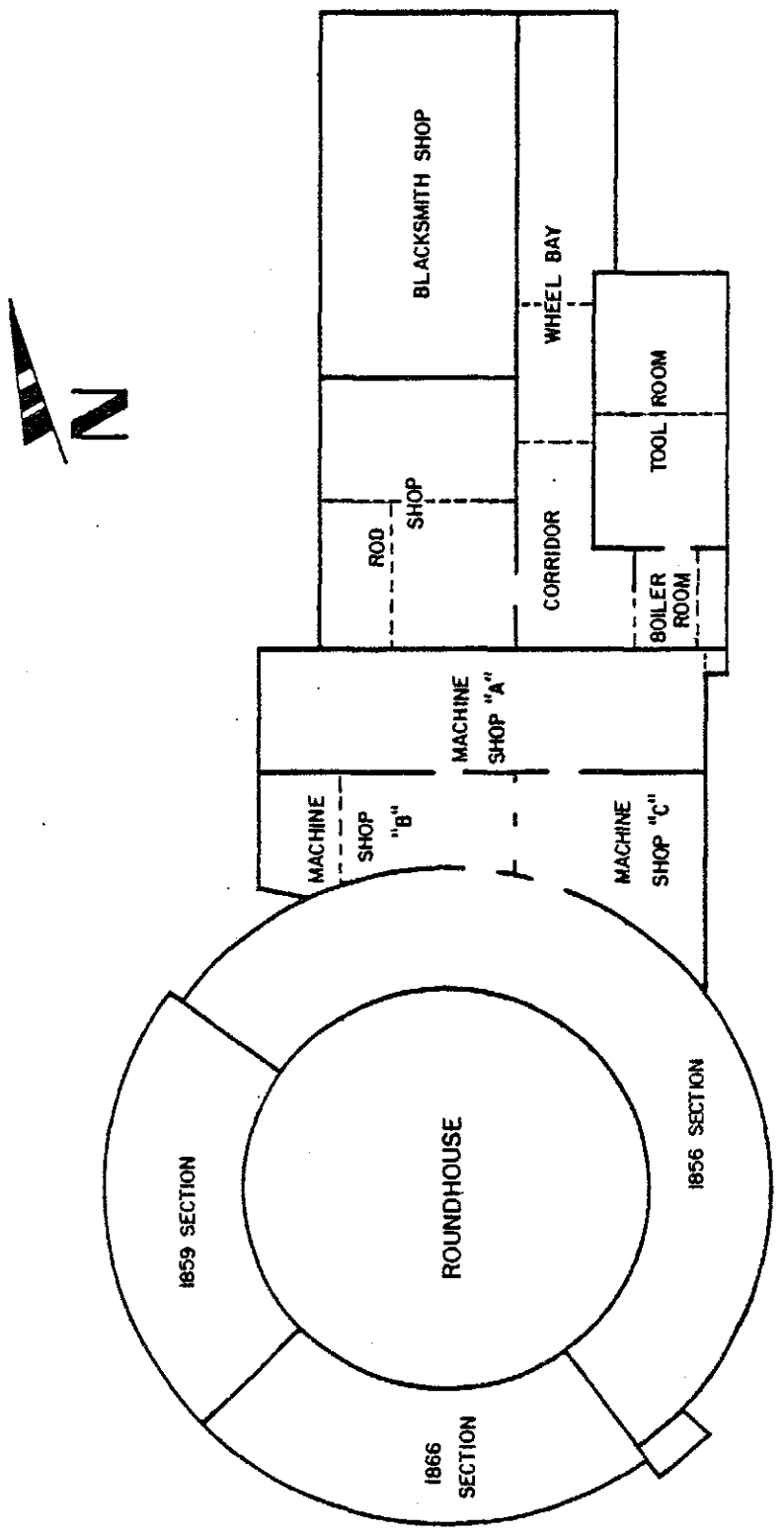

FIGURE 5
BUILDING IDENTIFICATION
SCALE 1" = 75'

CONSTRUCTION CHRONOLOGY

Preparations for the construction of company shops in Aurora were begun in the summer of 1855. The plans for the initial set of buildings were probably prepared by company officials, very likely by C.F. Allen who served as on-site architect and overall construction supervisor at Aurora. Construction of at least the foundations and perhaps some of the walls had taken place by early December, 1855, with activity resuming again the following spring. By July 17, 1856, the Aurora Guardian reported that despite the efforts of over 200 men, the buildings were only half completed. The car, paint, and carpenter shops, which were of frame construction, were completed in September, 1856, and were immediately put to use building various equipment for the Chicago, Burlington, and Quincy Railroad (CB&Q). The wooden blacksmith shop was enclosed by early September and presumably completed shortly thereafter.[1]

Work on the roundhouse and Machine Shop A progressed at a slower pace. These buildings were constructed of Fox River limestone from nearby Batavia, although a small portion of the stone may have come from a local quarry which began operation in 1853. On September 4, 1856, only the first story of the machine shop had been laid by the stone masons, and construction of the roundhouse was at approximately the same stage. By early October, masonry work on both the machine shop and roundhouse was nearly completed, and carpenters were already building the roof to cover the shop area. Final stages of construction took place in late October, including the installation of the stationary engine in the single story engine house wing of the machine shop.[2]

Of the 7 buildings completed in late 1856, four may be considered to be directly related to the set of structures that now stand in Aurora. These include 22 stalls of the roundhouse, the machine shop and attached engine/boiler room, and the blacksmith shop. The 22-stall roundhouse was 264 feet (80.47 m) in diameter with a low-pitched shed-type roof sloping toward the outside of the circle. End walls were also of stone and capped with slightly larger blocks in a terraced pattern that matched the roof pitch. The original roof is illustrated in a lithograph of the late 1850's (HAER IL-8-77) and in a pair of stereopticon photographs from the mid-1870's (HAER IL-8-79). The top of the original south end-wall can also be detected in these 2 photographs as well as in a contemporary photograph of an interior partition in the roundhouse (HAER IL-8-25). The machine shop was 180 feet by 50 feet (54.86 m by 15.24 m), with 2-story walls 37 feet (11.28 m) high topped by wooden trusses and a gabled roof. The attached engine/boiler room was a 1-story stone building, 40 feet by 24 feet (12.19 m by 7.32 m), with a flat roof. An eighty-five feet (25.91 m) brick chimney stood just outside the west wall of this building. The wooden blacksmith shop was a 1-story structure, 154 feet by 50 feet (46.94 m by 15.24 m), with low 14 feet (4.27 m) exterior walls, and a gabled roof topped by a clerestory (see HAER IL-8-77 and Figure 6).[3]

In 1858, the CB&Q decided to expand the roundhouse by adding another set of 8 stalls. The addition was placed on the west side of the circle, starting at what would have been the north end-wall of the original building. The north stone end-wall was removed and a brick wall was built in its place prior to the addition of the new set of stalls. The new addition was 6 feet 3 inches (1.91 m) longer than the original set of 22 stalls, and was completed sometime

in late 1858 or early 1859. The roof design on the original building was continued on the addition (see Figure 6).[4]

Increases in business during the early years of the Civil War made it necessary to add to the rolling stock used by the company, and those additions in turn necessitated improvements in repair and construction facilities. The machine shop complex was expanded with the addition of 2 stone buildings, one between the roundhouse and the machine shop and the other between the machine shop and the blacksmith shop. These 1-story, fire-proof, buildings were completed by early 1863. The new addition between the roundhouse and the original machine shop is the east two-thirds of what is now Machine Shop B (see Figures 5 and 6). The east wall now has 2 large arched openings that lead into Machine Shop C; the west wall of the structure is no longer standing (see Photograph HAER IL-8-53). The other addition, between the machine shop and the blacksmith shop, has no original walls remaining and occupied the southeast quarter of the present rod shop (see Figure 5).[5]

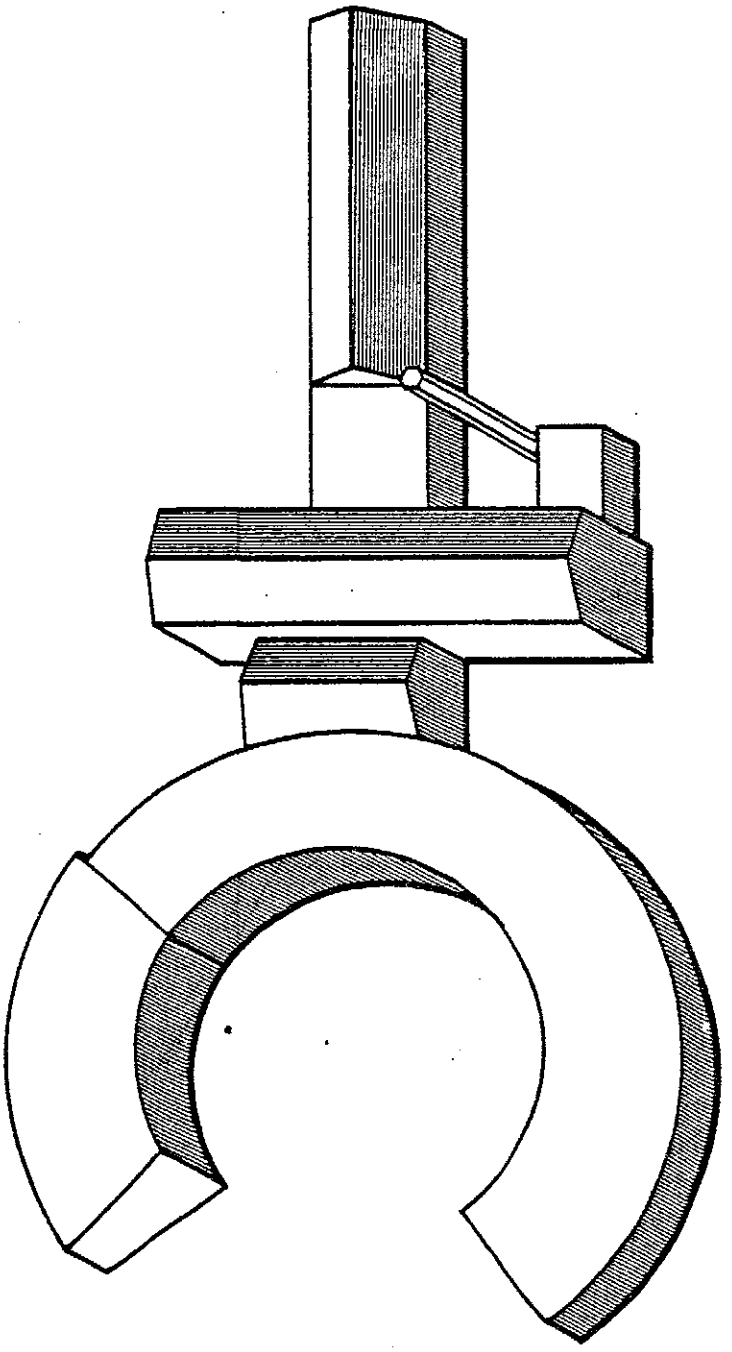

FIGURE 6
ROUNDHOUSE AND BACK SHOPS, JUNE 1863
AXIOMETRIC VIEW

A fire in December, 1863, severely damaged the original stone machine shop (Machine Shop A). The wooden roof trusses and roof were completed destroyed and the second story stone walls may have been badly damaged as well. The 2 new 1-story buildings that had been constructed less than a year before adjacent to this building sustained little or no damage. Some of the contents of the engine/boiler room were destroyed and it is possible that this building suffered roof damage. Immediately following the fire, company officials decided to rebuild the shop as a one story building and to expand its area slightly. A new one-story building was not constructed, but rather the second-story walls were removed and the structure rebuilt using the original first story. The placement of doors and windows in the first story of the original 1856 building is identical to the present Machine Shop A (compare the 1857/58 lithograph, HAER IL-8-77, and contemporary photographs HAER IL-8-34/36).[6]

Exactly what area of Machine Shop A was "expanded" following the fire is not known for certain, but it seems very likely that the expansion refers to an addition to the engine/boiler room. In 1864 or 1865, an engine room for the car department was built, although its location is not specified in construction reports. A few years later, however, this car department engine room was described as being attached to the locomotive boiler and engine room. We do know that sometime before the mid-1870's the building was expanded about 11 feet (3.35 m) to the east and a stone facade was placed on it that very closely resembled the new facade on the rebuilt machine shop. The original east facade remained as an interior partition separating the 2 engine rooms and a stone gable was added to the top of the original west facade. This new

addition can be seen in the 1878 site plan (HAER IL-8-88) and in a photograph taken between 1874 and 1878 (HAER IL-8-79).[7]

In 1864 or early 1865, the original wooden locomotive pits in the roundhouse were removed and rebuilt in stone. While this work was in progress, the pipes running under the floor for the steam-heating system were repaired and partially replaced.[8]

The final 10-stall section of the roundhouse was added in 1866. The new addition, like the original and 1859 sections, was made of stone and covered with trusses and roof matching the earlier portions. This section was 6 feet 6 inches (1.98 m) longer than the original 22 stalls. The south end-wall of the original section and the end-wall of the 1859 addition were retained as partitions in the completed roundhouse. The best view of the completed roundhouse with the original roof is the stereopticon pair taken between 1874 and 1878 (HAER IL-8-79).[9]

A major fire in May, 1873, destroyed most of the wooden buildings in the shop complex, including the blacksmith shop and brass foundry of the locomotive department. Although the fire threw many men out of work and disrupted repair and construction activities of the road for a number of months, it did provide the company with an opportunity to rebuild much of the complex according to a plan that had been on the drawing board for some time. The principal building to be reconstructed in the Locomotive Department was the blacksmith shop, which was built using the entire 50 feet (15.24 m) south foundation wall and 150 feet (45.72 m) of the east foundation wall of the old building. A. Walbaum, a local builder, was awarded the contract for the project which was to be completed in 60 days. Where possible, local materials were used in the project; huge stones for new foundations were obtained locally from a Mr. Karl

and from a firm owned by Randall and Stevens, 600,000 bricks were ordered from Mr. Solfsburg, and the rest came from the Excelsior Brick Works located between Aurora and Chicago.[10]

The remaining walls of the old blacksmith shop were demolished during the first week of July, 1873, and the following week the laying of the new brick walls was begun. By mid-August the walls of the blacksmith shop were up and the iron roof trusses were placed on the building in September. On the 15th of October, the workers began laying slate in mortar on the roofing boards; this task was completed on October 24. A large stone platform to hold a 10-ton anvil was put in place in late October also. In late November, machinery and tools were being moved into the completed blacksmith shop. The new building was 200 feet (60.96 m) long and 80 feet (24.38 m) wide with 22 1/2 feet (6.72 m) high side walls. A brick partition wall in the new building separated the formal blacksmith shop from a smaller section to be used as a boiler shop (see Figures 5 and 7). The south facade of this building has been removed, but the upper portion of it can be seen in the stereopticon pair taken shortly after it was built (HAER IL-8-79) and in an 1898 view (HAER IL-8-82).[11]

No additions or modifications to the roundhouse and backshops are recorded until a flurry of activity occurred in 1878. In January of that year, the Aurora Beacon reported that a coal house had been erected just north of and connected to the boiler room of the machine shop "from which coal will be run to the doors of the furnaces upon rubber cars." At about the same time, the floor of the machine shop, which had settled badly, was re-leveled and stones were replaced as needed. During the summer and fall, a new turntable was put in the roundhouse. This would have been made of either cast or wrought iron,

possibly built in the connecting machine shops, and probably 45 feet to 50 feet in length. New curbing--a shelf which supported the ends of the table as it turned--included very large blocks of cut stone laid on a cement foundation. Another small improvement included the rebuilding of the furnace which drove the steam hammer in the blacksmith shop.[12]

The major activity in 1878 was the construction of a new iron roof for the roundhouse. The wrought iron for the roof trusses was manufactured by Phoenix Iron Works and the trusses were fabricated by Morrison, Field and Co. of Buffalo, New York. Charles C. Keepers, whose father had erected railroad bridges for the latter company, was placed in charge of the project. The trusses were assembled on the ground and "heavy machinery" was used to lift them into position. Some of the iron cords to be used in the roof arrived on the site before May 18, 1878, and in mid-June masons were rebuilding the upper three or four feet of the inside brick wall (see photo HAER IL-8-21). Roof construction began in late July, and one-half of the roof was ready for slate by August 8. All of the iron work was up on August 31, and slating was nearly completed by the second week of September. Twelve double skylights were placed in the north side of the new roof, and although no longer extant they can be seen in a turn-of-the-century photograph (HAER IL-8-81). Stone masons also spent a considerable amount of time renovating the original walls of the roundhouse. An Aurora Beacon report of September 7 stated that 12 stalls on the east side of the building were lengthened four feet at this time, although there seems to be no evidence that any changes were made to the inside or outside diameters of the roundhouse.[13]

Figure 7, below, represents the roundhouse and backshop complex following the construction of the new roof in September 1878.

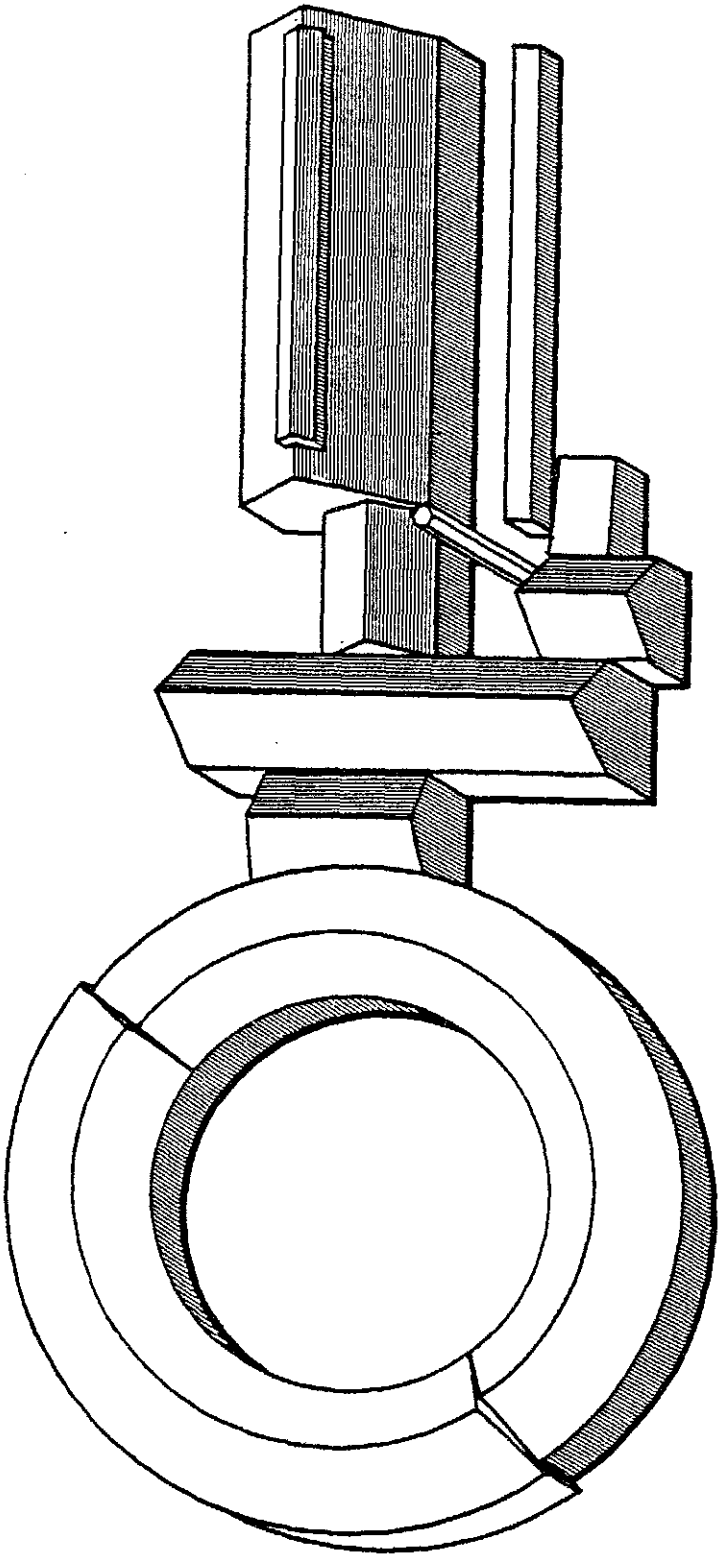

FIGURE 7
ROUNDHOUSE AND BACK SHOPS, SEPTEMBER 1878
AXIOMETRIC VIEW

At the same time that the roundhouse improvements were being completed, plans were developed to add to and modify the buildings in the attached backshop complex. The plans, which are discussed in more detail in Part I, "Historical Narrative," were designed to save money through the consolidation and rearrangement of shop areas. Three major additions to the complex were proposed. Two of these additions would fill in the areas between the Roundhouse and the old stone machine shop; the third area would fill in a gap between the blacksmith shop and the machine shop. For whatever reasons, these plans were not implemented immediately, but buildings similar to those proposed were eventually constructed over the next thirty years.[14]

The plans for Machine Shop C called for a single brick wall 83 feet (25.3 m) long to be built on a stone foundation between the end of the east wall of Machine Shop A and the northeast wall of the roundhouse (see Figures 5 and 7). The roof would be made of iron rafters and purlins and covered with boards and galvanized iron. This building was very likely built sometime between 1882 and 1897. An 1882 aerial perspective of the city suggests that the addition had not yet been made, but an 1897 Sanborn map shows an outline of the complex with this section completed. The structure that was built here did not quite conform to the original plan; the brick wall and stone foundation were the same, but the actual building had 7 windows instead of the planned 6 and the roof structure was wooden beams supported by tubular steel columns instead of the iron components originally proposed. The current building does have skylights as called for by the initial design.[15]

The west addition to Machine Shop B was to include a brick wall 67 feet (20.42 m) long on a stone foundation with iron rafters and purlins covered with boards and galvanized iron. The addition was not made until more than 20

years later. Neither the 1882 aerial perspective nor the 1897 Sanborn map show anything at this location, but more importantly, an 1898 photograph confirms that the building had not yet been constructed (HAER IL-8-82). However, an 1908 piping diagram shows the present, and somewhat unusual, outline of the outer wall of this building. When the building was finally constructed between 1898 and 1908 major changes were made from the original plans. Instead of brick, the outer wall was constructed of stone similar to the roundhouse and adjoining machine shop. In addition, this wall was not a straight line, but jogged southeast before intersecting with the roundhouse (see Figure 5). The roof construction seems to have been fairly similar to the original plan except steel trusses were used instead of iron.[16]

The final addition called for in the 1878 proposal was a structure that would become the southwest section of the present rod shop (see Figure 5). The low gabled roof over the small stone building between the machine shop and the blacksmith shop was to be removed, the brick west wall of the blacksmith shop was to be extended south to meet the stone machine shop, and the iron roof of the blacksmith shop would be extended over this area to a new brick gable constructed on top of a section of the stone wall of Machine Shop A. When this building was finally constructed, the original plans seem to have been followed fairly closely. However, some additional work must have been done during construction. The original east and west stone walls of the small connecting building were completely removed and new brick walls erected enclosing the expanded area, and the south wall of the blacksmith/boiler shop was demolished. Construction took place between 1898 and 1908: the building is definitely not present in the 1898 photograph but does appear in outline form on the 1908 piping diagram (see Figure 8).[17]

Sometime before 1908 another addition was put on the backshops, although this one had not been proposed in 1878. A boiler room, approximately 56 feet by 50 feet (17.07 m by 15.24 m) was added to the north side of the old stone boiler/engine room. Nothing of the wall or roof materials of this structure is known for certain since the only evidence for its existence is found in the 1908 and 1923 site plans. It is possible that this boiler room is the south half of the present tool room (see Figures 5 & 9), although this is only conjecture.[18]

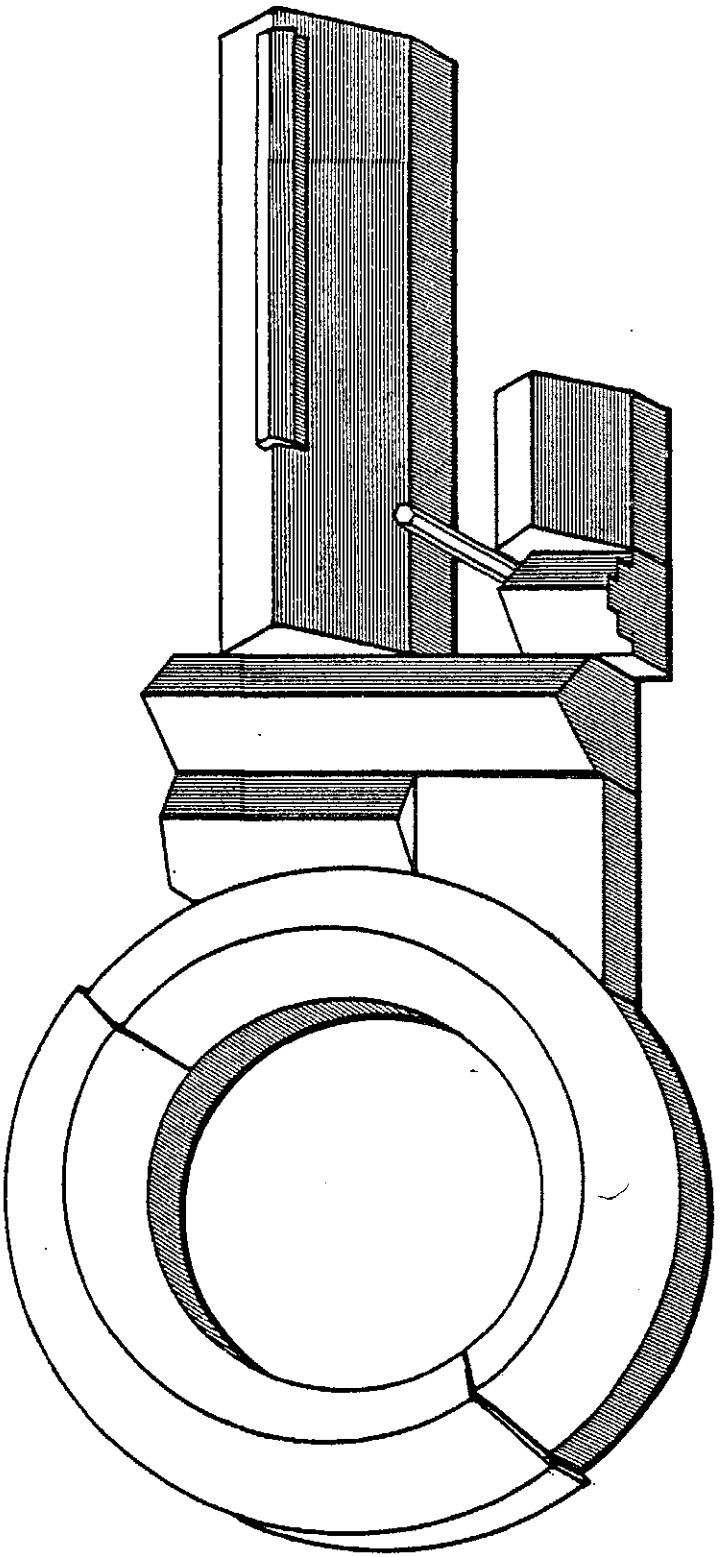

FIGURE 8
ROUNDHOUSE AND BACK SHOPS, SEPTEMBER 1908
AXIOMETRIC VIEW

The construction or completion of the tool room is also a matter of some speculation. The 1923 site plan shows only the boiler room discussed above, but a 1926 yard layout labels an area encompassing the present tool room as a 'Boiler Room.' Expansion of the boiler room into a larger area in the mid-1920's would be consistent with other changes that took place when the locomotive department was converted into a manufacturing department. While dating the tool room to this period seems appropriate, we can say positively that it was there by 1940.[19]

The same type of speculation occurs when trying to date a 'new' facade that was put on the east end of the original engine/boiler room. An expanded room with a stone facade had been added about 1865 (see photo HAER IL-8-79), but at some point in time this was replaced with a brick one (see photo HAER IL-8-8 & 51). There are similarities in the brick work on this "new" facade and on the tool room, leading to the possible conclusion that some of the construction occurred in the same time period. Although no definite date can be established with the evidence currently available, the new facade probably dates from the period 1900-1930.

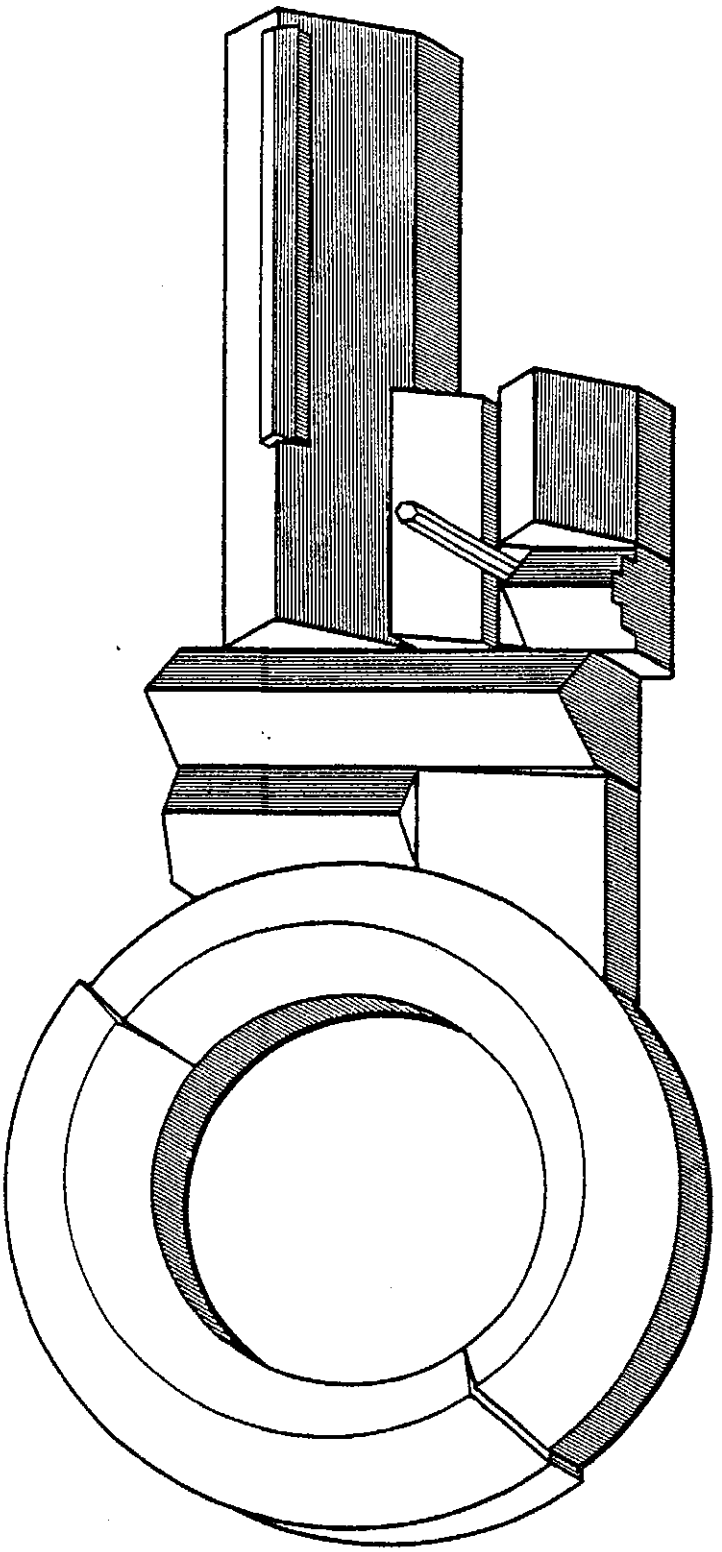

FIGURE 9
ROUNDHOUSE AND BACK SHOPS, 1926
AXIOMETRIC VIEW

The final set of structures in the complex to be considered are the corridor and wheel bay which were built in at least 3 stages during the twentieth century. The initial wheel bay was covered some time between 1908 and 1923 and probably included about one-half of the wood lattice trusses that still support the roof. By 1940, the roof enclosed the area up to the end of the tool room, and in 1954 the large corrugated steel building was added completing the wheel bay.[20]

A number of minor modifications were made to these buildings between the time of their original construction and the present. Several of these changes will be discussed in the section below which traces the functions of and mechanical processes in each of the structures.

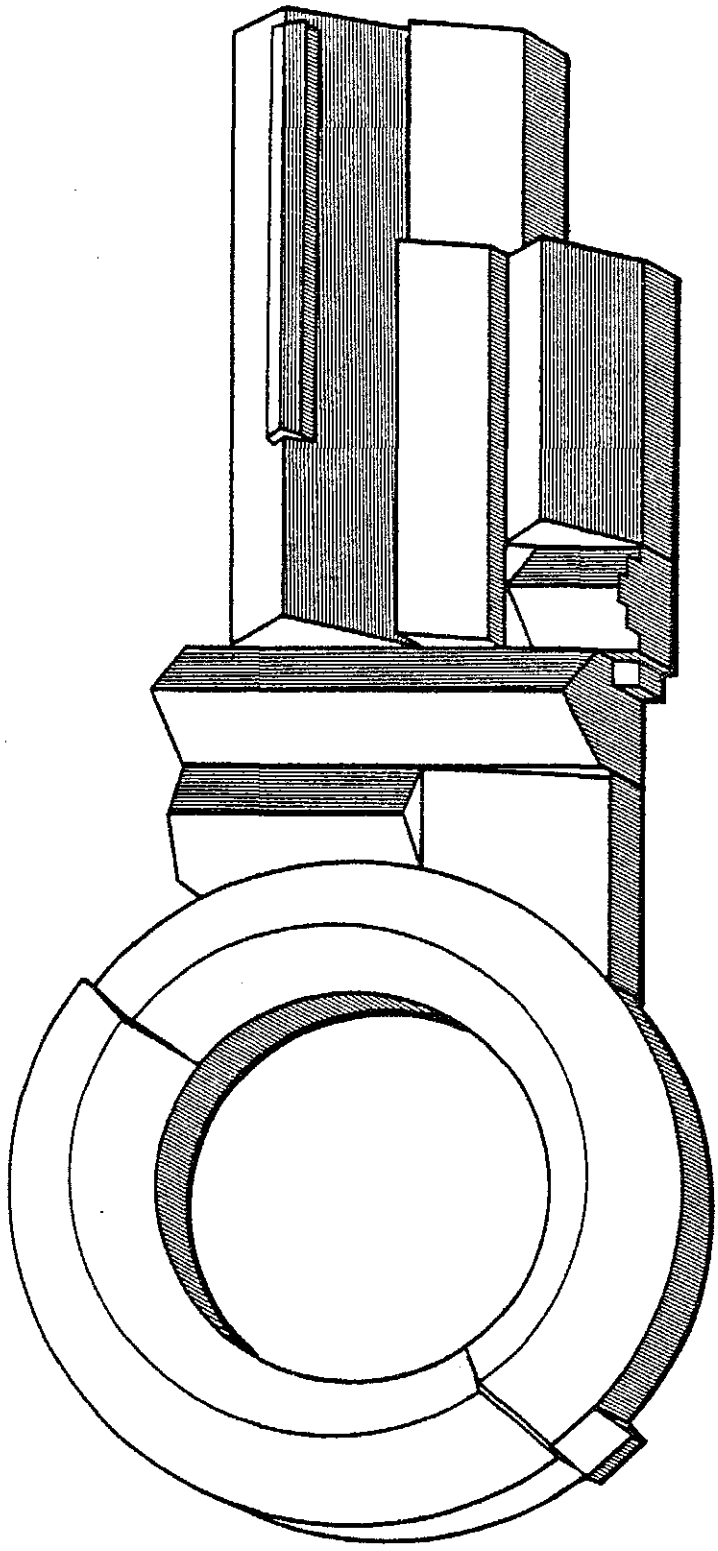

FIGURE 10
ROUNDHOUSE AND BACK SHOPS, 1955
AXIOMETRIC VIEW

FUNCTIONS AND MECHANICAL PROCESSES

The names that have been used to identify each of the structures in the complex are partially derived from titles that reflected their respective prominent historical functions. The identifications used in Figure 5, however, tend to mirror the twentieth century functions and do not capture the evolution of activities that occurred since each building was constructed. The varying functions and mechanical processes that took place within the roundhouse and backshop complex are described in detail below.

The Roundhouse

Beginning in 1856, the roundhouse served (as did several other roundhouses on the CB&Q) as a terminal point to shelter locomotives between trips, to turn them around as needed, and to take care of daily maintenance and minor repairs. The roundhouse was where train crews were headquartered, and where scheduling and other activities associated with making up trains and dispatching them occurred. These functions continued to be the major activities in the building until some time after the second roundhouse was built in the 1870's. By the late nineteenth century, the new roundhouse seems to have become the "terminal building" at Aurora, and the major repair and construction activities became centered in the old roundhouse and its attached backshops.[21]

Specifically, the roundhouse and the attached Machine Shop B became "erecting shops" where engines were built from the late 1860's to about 1920. Initially, the erecting shops contained six stalls with floor pits for the construction and major repair of steam locomotives. Over the next thirty or

forty years, the "erecting shops" took over more and more of the stalls in the roundhouse until in the early twentieth century the entire building was called an erecting shop.[22]

The erecting shop was the place where all of the various parts that made up a locomotive were brought together and assembled into the final product. The locomotive frame came from the foundry, the boiler from the boiler shop, and the wheels, axles, main and side rods, cylinders and other precision parts from the machine shops. The order in which the parts were assembled depended a great deal on whether overhead cranes could lift the entire engine or just various components during construction. In the early days with minimal lifting equipment, the entire assembly process probably took place on the tracks in one of the stalls with little movement of the engine until it was completed. Driver wheels and axles would have been mounted on the frame first, then boiler and cylinders added, with rods, front and rear trucks, cab and other details going on last. Large overhead cranes could have allowed the order of construction to be varied somewhat, and the engine to be moved from place to place in the shops instead of remaining stationary.[23]

After 1900, the majority of steam locomotives built for the CB&Q came from outside locomotive works rather than from the company's own shops. The accelerated demand for new locomotives was far greater than company shops could handle and the increasing size and weight of these new engines made all of the CB&Q shops, including Aurora, obsolete as major construction centers. With the exception of two dozen engines built at West Burlington in the late 1930's, steam locomotive construction ceased at Aurora and the other shops in 1918. The erecting shop function of the roundhouse, therefore, ended about

1920 and over the next fifty years the building was altered to accommodate new activities.[24]

In 1925, half of the pits in the original section of the roundhouse were filled, and in 1927 the turntable was removed. The arched doorways on the interior circle were closed with steel-sashed windows (see photos HAER IL-8-18, 19, 21), and some of the doors and windows on the exterior circle were enclosed or altered (see photos HAER IL-8-30 & 31). The original 22-stall section was converted into a forge shop with furnaces located along the outside walls, and power hammers, drills, shears, and punches arranged along the interior wall. At about this same time, the 8-stall 1859 section became a boiler shop and the eastern half of the 1866 section became a cab shop. By 1941, the north end of the boiler shop contained a forge, riveter, shears, and side and vertical punches while a variety of drills and the well and water pump were in the southern section. These new shops along with other specialty areas in the attached buildings became the heart of the new manufacturing department at Aurora.[25]

The 1866 section of the roundhouse was converted into a "drilling and threading run" during the 1930's, although in 1941/42 plans were made to locate a spring shop here. The spring shop was eventually put into operation following a number of modifications to the area. Two monitor ventilators were placed on the roof over this section (see photos HAER IL-8-13 & 85), additional concrete floors were poured, and an oil storage tank was built outside the interior wall to furnish quenching oil to several tanks inside (see photo HAER IL-8-24). In the west end of this shop an overhead monorail system moved springs between a heat treating furnace, water quenching tank, salt bath furnace, a double treating furnace, and the oil quenching tank. The

middle portion of the shop contained several large furnaces, spring formers, and four oil quenching tanks. A rolling machine, shears, punch shear, and eye sender were located in the eastern section of the shop.[26]

Machine Shops

Machine Shop A was where major repairs and construction activities took place during the first decades of operation. In 1868, the equipment in this shop included a wheel lathe, radial drill, shaping or slotting machine, horizontal boring machine, compound planers, other lathes of various sizes, other planers, upright drills, bolt and nut cutters, a punching machine for making washers, and a centering machine. Many of these machines were used to shape and smooth rough wrought iron and steel forgings from the blacksmith shop or cast iron or steel pieces from a foundry. The south facade of the building contained 4 large doorways approximately 12 feet (3.66 m) wide through which locomotives could be brought in and out of the shop. Two similar doorways on the north side allowed locomotives to pass through the shop if necessary. If any new locomotives were constructed in Aurora during the first few years of operation, that work would have taken place in this machine shop. Prior to the 1863 fire, wooden patterns were stored in the loft of Machine Shop A, although what other activities took place on the second floor is unclear.[27]

With the equipment listed as present in Machine Shop A in 1868, it was possible to finish all of the castings and forgings that made up a locomotive. For example, axles and tires could be turned to final size and shape on the lathes; the main and side rods could be shaped on the slotting machines and planers and then bored; and cylinder castings could be finished on the lathes and the boring machines. However, as additions were made to the complex,

these activities changed. Machine Shop A served with Machine Shop B as an erecting shop until activities were moved into the roundhouse. Major repair and construction of boilers took place in the main shop until 1863 when a separate boiler shop was constructed in the southeast corner of what is now the rod shop. Before 1923 wheel and axle activity were moved to their own area, and about 1925 rod machining moved into a separate shop. With these functions removed from the machine shops, space was available for other activities.

All air-brake repairs for the CB&Q East Lines were concentrated in a special air-brake shop at Aurora by the early 1930's. This facility was located in Machine Shop B and may have encompassed parts of Machine Shop C as well. Passenger and freight car air-brakes were tested and repaired here using a variety of special equipment, some of which was fabricated locally. As many as 90 air-brake triple valves were repaired per day in an assembly-line process. Activities in the shop included the stripping and cleaning of valves, careful inspection of parts at every stage, grinding of valves as needed, cleaning and replacement of gaskets, boring of piston bushings, and the replacement and fitting of rings. Air-brakes coming out of the shop were transferred back to the main store house for distribution to repair facilities throughout the system.[28]

Boiler Room/Tool Room

The small 1-story wing on the back of Machine Shop A held the stationary engines and accompanying boilers which provided power to all of the machinery and heat to all of the buildings in the complex. In 1856, one 80-horsepower engine and a boiler were located here, but in 1863 two new boilers were

installed. Following the 1863 fire, new equipment was placed in an expanded building and this included 2 large boilers, a 100-horsepower Corliss engine which drove all of the machinery in the car department, and a 100-horsepower engine from the Cuyahoga Works of Cleveland which supplied power to the locomotive department.[29]

The construction of a new engine and boiler room for the car department in another location (in 1873) meant that the old engine/boiler rooms in the complex had only to serve the needs of the locomotive department. Subsequently, the old Corliss engine was removed from the east engine room and the area was converted into a pattern shop for the locomotive department. The remaining engine room continued to function in that capacity, but the use of the facility for heating the building ended in 1878. In that year a boiler room was added to the new roundhouse and heaters attached to this new facility served the new roundhouse as well as the old roundhouse complex, the office building, and the oil house.[30]

The large machinery in the backshops was powered by belts connected to the stationary steam engine located in this boiler room. In 1878, the addition of a coal house to the north end of the room provided a more efficient fuel delivery system, and sometime before 1908 this coal house was replaced by an expanded boiler room. This structure occupied the south half of the present tool room and presumably contained larger boilers to handle the power demands of the locomotive department. The building was further expanded in the mid-1920's, and seems to have been used as an even larger boiler room for a few years. However, the construction of an electric power house at Aurora in 1922 allowed the CB&Q to convert air compressors, pumping equipment, and other shop tools to electricity. By the 1930's, the need for steam power

had been so reduced that the expanded boiler room was converted into a tool room.[31]

Blacksmith Shop

The 1873 fire destroyed the wooden blacksmith shop and most of the buildings of the car department. The present blacksmith shop was built at this time using part of the foundations of the old buildings. One of the principal features of the new blacksmith shop was a huge stone platform upon which a 10-ton anvil rested. The platform was 10 feet deep and covered 16 square feet at the floor level. One stone used in the construction measured 6 feet by 12 feet and was more than 2 feet thick. This building continued to serve as a blacksmith shop until well into the twentieth century. Although no functional description of the Aurora blacksmith shop has been found, evidence remaining in the building and reports of several other railroad blacksmith shops provide data for a tentative discussion of its operation at the turn-of-the-century.[32]

At least 12 forges with brick wall-chimneys existed when the building was constructed in 1873. At this early date, a large steam hammer to shape rods and other large items was also in use. A 1903 photograph shows this hammer (or a later replacement), an overhead crane holding a rod, and the old locomotive boiler used to power the hammer (HAER IL-8-84). This single jib crane and 7 other smaller ones in the shop assisted employees in moving heavy, hot, pieces of metal from furnaces to hammers and back. Two smaller hammers had forges nearby as well as jib cranes and overhead rails to move objects about the area. Pits in the present cinder floor may represent former water tubs, and stone and concrete pads suggest that additional large equipment such

as shear punches or bull-dozers to bend metal may have also been present in the blacksmith shop. The reconstructed blacksmith shop plan shown in Figure 11 is based upon historic photographs and evidence still remaining in the building.[33]

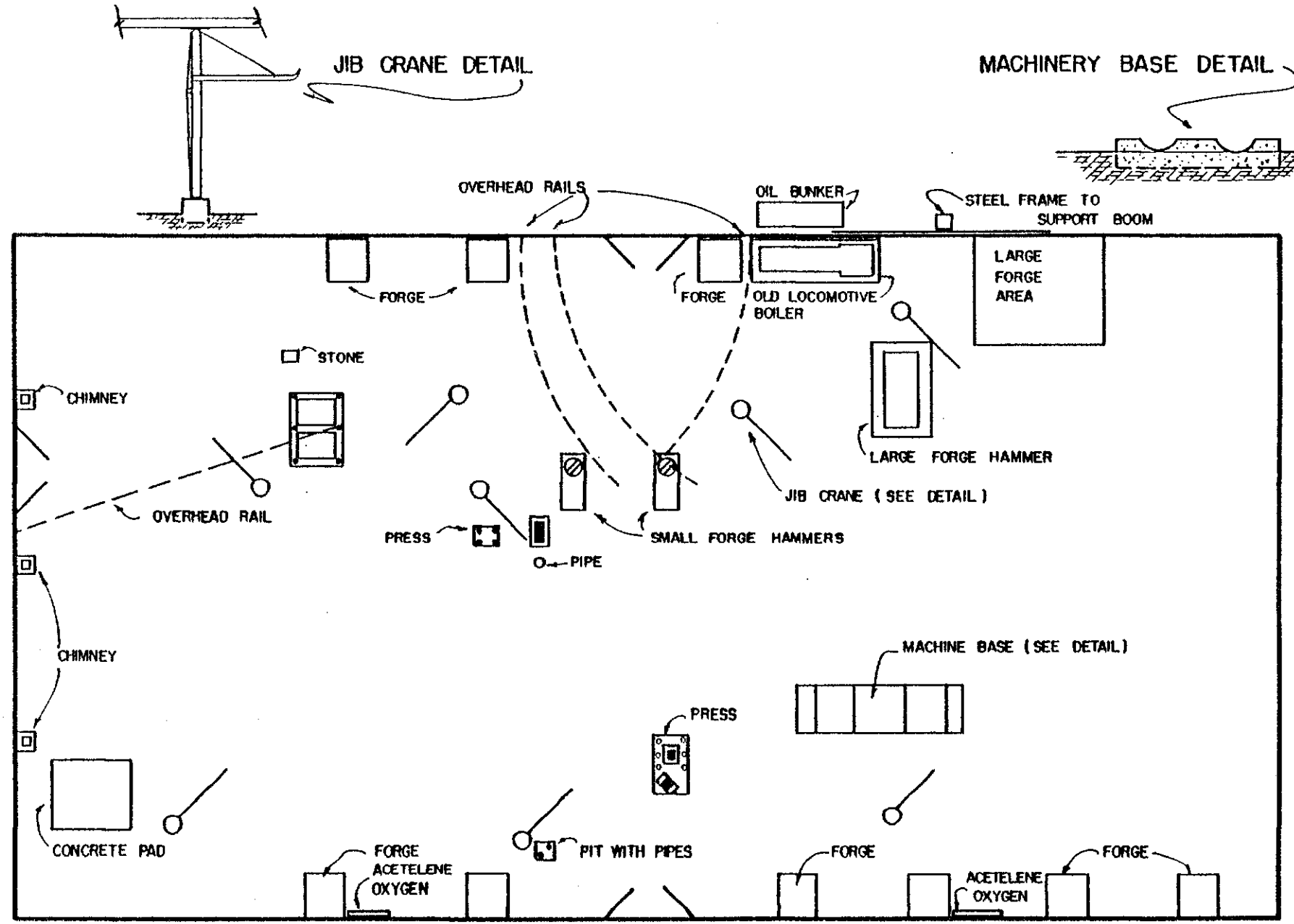

FIGURE 11

BLACKSMITH SHOP

NOT TO SCALE

Boiler Shop/Rod Shop

The structure built in 1873 included not only a blacksmith shop, but a new boiler shop located in the southern one-fourth of the structure. This shop, which stood in what is now the north half of the rod shop, replaced the smaller boiler shop built in 1863. The 1863 building was then converted into a sheet iron work shop and a room for tools associated with boiler making and repair (see photo HAER IL-8-88). Sometime between 1898 and 1908, this boiler shop area was expanded into the structure now encompassed by the rod shop and boiler making activities continued at this location until about 1925 when boiler construction and repair was moved into a section of the roundhouse.[34]

In 1925, this area was converted into a shop to build and repair steam locomotive rods for the entire CB&Q system. Some of the machinery in the shop included slab millers, vertical millers, 4 inch and 5 inch rod drills, a slotter, turret lathe, crank shaper, and hydraulic rod press. The shop was organized on a production line basis (see Figure 12). Forged rods were received from the blacksmith shop and transferred to the slab and vertical millers for basic shaping. They were then moved by overhead traveling cranes to the roughing bench area where large holes were cut using the drilling machines. Next slotting machines, lathes, and shapers would have been used as needed to finish the rods before they were sent to the company storehouse. The overhead cranes were initially hand operated, but later electrical systems were installed which allowed these to be operated from the floor with push-button controls. The main traveling crane which ran north and south along the east side of the shop is extant as is some of the additional truss

work erected to support the other cranes and booms (see photos HAER IL-8-62, 65, 66, & 67).[35]

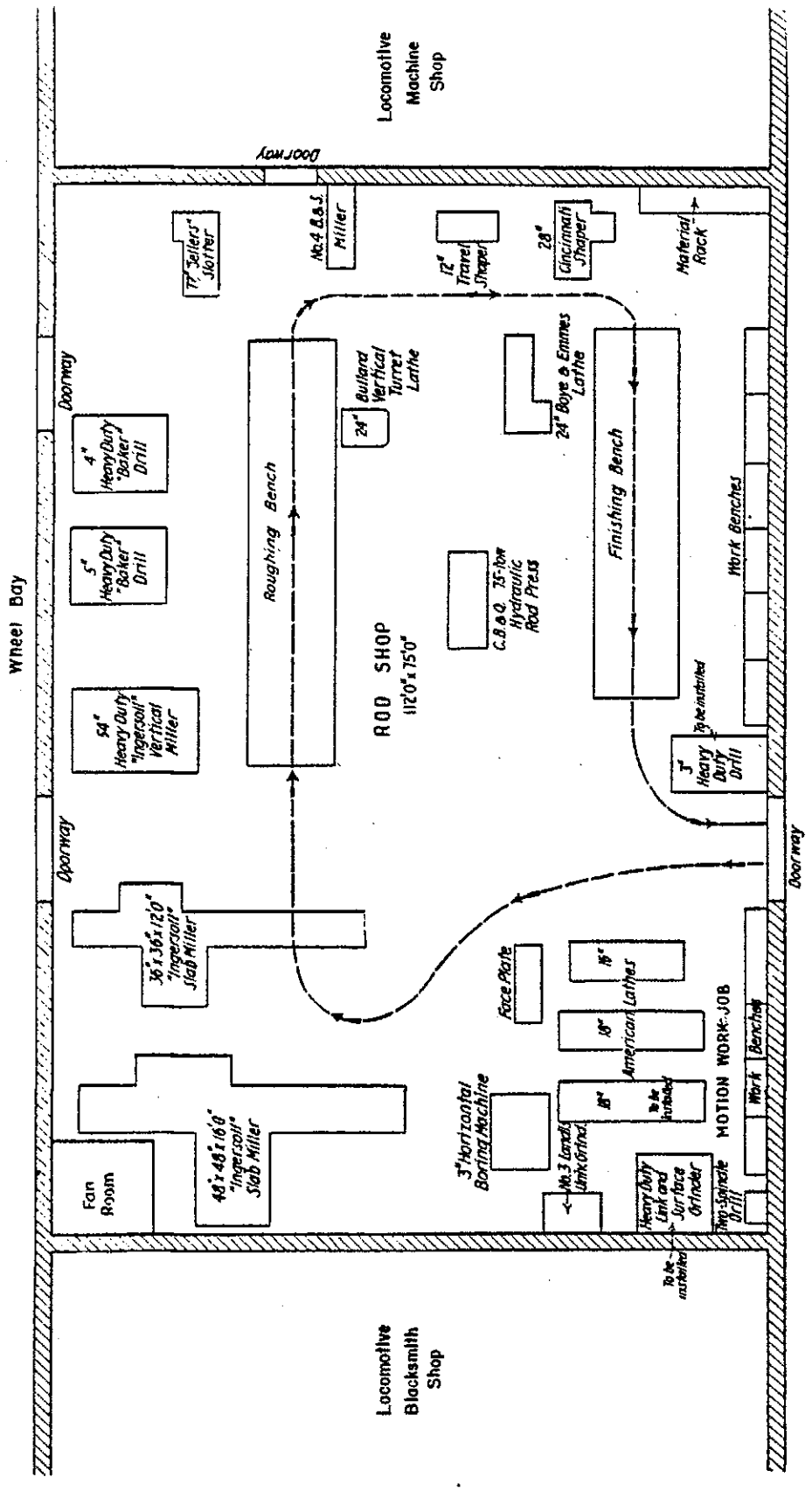

FIGURE 12
ROD SHOP

PLAN REPRODUCED FROM *RAILWAY MECHANICAL ENGINEERING* VOL. 99 (1925) p. 352.

Wheel Shops

Wheels for both locomotives and cars were produced and repaired in the Aurora shop complex. The earliest activity probably took place in one of the machine shops, as a special area for wheel work was not constructed until sometime between 1908 and 1923. This wheel bay represented the roofing over the outside corridor between the blacksmith/rod shops and the tool room, although the final addition to the bay was a 3-sided building. By 1937, this shop specialized in the production and repair of car wheels for the high-speed Zephyr trains.

Repairs began with the removal of wheels and roller bearings from the axles. Axles were then cleaned in hot oil and inspected for wear or damage. If replacement axles were needed, they were turned to a smooth finish on a 24-inch engine lathe. New wrought steel wheels were machined on a vertical turret lathe and then finished on a double-end floating tool. Wheels were then remounted on axles and placed on a machine that ground the treads to within a tolerance of .005 inch. Finished wheel and axle assemblies were carefully wrapped in oil-soaked canvas for protection during shipping.[36]

The exact layout of this wheel shop is not known, but several photographs indicate where some of the equipment may have been placed. The 24-inch engine lathe probably operated along the west wall of the bay near the panel of electrical boxes (see 35mm photo 2-19), with the treading and other machines arranged along the east wall. Wheels and axles were brought into the shop through a north entrance and an overhead traveling crane moved the pieces from station to station in the shop (see photos HAER IL-68 & 86). The wheel shop remained in this location until the complex closed in 1974.

STRUCTURAL CHARACTERISTICS

Information on the structural features of each of the interconnected buildings in the roundhouse/backshop complex are primarily based upon: (1) measurements taken at the site by an Historic American Engineering Record recording team in the fall of 1977; (2) data gathered by Murphy Engineering Inc. for a 1980 rehabilitation feasibility study; and (3) on-site observations, sketches, and field and record photographs made by a recording team from Dennett, Muessig, Ryan & Associates in September 1983.

Roundhouse

The 40-stall full circle roundhouse is built of stone, wood, and iron. The exterior wall is formed by 2 semi-circles, one with a radius of approximately 131 feet (40 m) and the other with a radius of 137 feet (41.76 m). The smaller 22-stall section built in 1856 and the final 10-stall section completed in 1866 have walls of buff colored dressed limestone, while the 8-stall 1859 section is comprised of rougher, frequently rubble-like limestone of the same color (compare HAER IL-31 with 32, and see 35mm 5-6A). Exterior wall openings are of two types: rectangular windows with stone lintels and sills--most of which remain (HAER IL-8-32 & 33), and larger arched locomotive doorways of limestone supported by cast-iron frames which have been altered or enclosed since initial construction (HAER IL-8-31). The top 20 inches of the exterior walls are constructed of red brick, and the foundations are of large limestone blocks laid on a natural bed.

The interior wall is a single circle approximately 80 1/2 feet (25.65 m) in radius constructed of red brick supported by iron columns and circular arches (HAER IL-8-21 & 23). Several of the original wooden doors hung with

iron strap hinges still remain (HAER IL-8-22), although the majority of arched stall openings have been filled in with metal lathe and plaster walls and steel-sashed windows (HAER IL-8-18 & 19). Foundations are presumed to be of large stone.

The floor of the building is concrete with a variety of pits, tunnels, and troughs. Three interior partition walls divide the roundhouse according to its 3 construction stages. A brick wall divides the north end of the 1856 section from the 1859 section (HAER IL-8-27), while the other 2 walls are original exterior stone walls topped with brick gables (HAER IL-8-25 & 26).

The iron Fink roof trusses are supported by both the exterior and interior circular wall. The top cord of the truss and the diagonal compression member are iron I-beams, while the bottom cord and the tension members are eyehooked wrought iron rods (HAER IL-8-28 & 29 and 35mm 8-3 & 7-35A). The top cords of adjacent trusses are linked laterally by small queen truss purlins made of angle iron and iron bars. Two by four wood rafters lie on top of these purlins and are covered with sheathing boards and tar paper. The original (1878) roofing material was slat laid in mortar on boards. Skylights, monitors, and ventilators are mounted on the roof at various locations (HAER IL-8-85).

Machine Shop A

This building was constructed at the same time as the first section of the roundhouse and was originally a freestanding 2-story structure. The building is a rectangle 180 feet (54.86 m) by 48 feet (14.63 m) and built of the same type of limestone used in the roundhouse. The south wall has 4 large arched locomotive doorways with cast iron door frames (HAER IL-8-36 & 39), and 11

rectangular windows with stone lintels and sills (HAER IL-8-40). The north facade is similar, but with only 2 arched doorways (HAER IL-8-41 & 42) and 10 rectangular windows. Interior window lintels and sills as well as the original sashes were of wood (HAER IL-8-44). The east and west facades each have an arched doorway and 3 rectangular windows (one in the east facade is no longer extant), and have identical stone gables (HAER IL-8-9, 16, 37, 38). Foundations are of stone and rubble and the floor is poured concrete.

The north and south walls support Howe roof trusses that combine a T-beam top cord with rod struts, ties, and bottom cord (HAER IL-8-34 & 35). At each panel point the rods fit into a casting and are secured with a bolt. The main trusses are connected laterally at the top by a smaller T-beam with a King rod truss, and at the bottom cord are connected in the middle with a single rod (35mm 3-31 & 34, 4-3A & 5A). Wooden rafters and sheathing boards are covered with tar paper except where 8 large skylights have been inserted (HAER IL-8-45 & 85).

Machine Shop B

In 1863 Machine Shop B was constructed as a connecting building between the roundhouse and Machine Shop A. It shared north and south walls with those buildings and therefore is only a 2-walled structure. The original east exterior facade is made of stone and now serves as a partition wall separating this building from Machine Shop C. This facade is 42 feet (12.80 m) in length and is constructed of limestone blocks--finished stone on the exterior and rough, rubble stone on the interior (compare HAER IL-8-53 and 35mm 1-3A). Large doorways with brick arches dominate the facade although these probably date from the time when Machine Shop C was added (1882-1897) and not from

initial construction. The original west stone facade is no longer standing and was probably demolished when the present west wall was built (see Figure 5).

The new west facade was constructed between 1898 and 1908 with an exterior stone facing backed by rubble stone lower courses and brick upper courses extending to a low-pitched gable (HAER IL-8-52 and 35mm 4-14A). Openings in this wall include a single doorway and 4 windows, all rectangular in shape. The sills and lintels of these windows are cut stone, and frames and sash are wood (HAER IL-8-16). The west wall begins at the end of Machine Shop A and extends south 49 feet (14.94 m) before making a 20-foot (6.10 m) dog-leg to join the roundhouse wall (HAER IL-8-15).

The north wall (belonging to Machine Shop A) and the south wall (belonging primarily to the roundhouse) support 9 Pratt trusses. The 6 trusses spanning the original building are composed of a T-beam top cord with metal struts, ties, and bottom rods and are similar to those in Machine Shop A. A rectangular metal bar connects the trusses at the ridgeline and a single rod joins them at the bottom cords. Additional lateral support is provided by rods joining the bottom cord to metal purlins at the roofline (HAER IL-8-52 & 54, 35mm 4-24A, 27A, 32A, 34A). The 3 remaining trusses that span the newer section are of the same design, but are constructed completely of riveted T-beams without the lateral diagonal support rods (HAER IL-8-52 and 35mm 9-12 & 6-25). The roof is similar to that on Machine Shop A with wood rafters and boards, tar paper, and skylights.

Machine Shop C

Machine Shop C was constructed sometime before 1908, probably between 1882 and 1897. The structure includes only one facade, with the other 3 walls of the enclosed area being defined by the roundhouse, Machine Shop A, and Machine Shop B. A brick addition to the top of the east gable of Machine Shop B allows the flat roof of Machine Shop C to intersect with the roof of Shop B (HAER IL-8-85). The east facade is 85 feet (25.91 m) in length and built of red brick with a limestone cap. Openings include 7 rectangular wood windows with stone lintels and sills, and a single rectangular doorway originally topped by a brick arch (HAER IL-8-9). Foundations are presumably limestone and the floor is of poured concrete.

A flat shed-type roof is supported by large wooden beams on 5 fluted tubular metal columns. The columns are held in position by brackets bolted to the floor and the wooden beams. Wood purlins connecting the 2 major support beams are held rigid by a small King rod truss (HAER IL-8-55 and 35mm 4-8). Wood rafters are covered with wood sheathing boards and tar paper. Three skylights are also present in the roof.

Blacksmith Shop

This shop was built in 1873 and originally included the south half of what is now the rod shop. The rectangular structure is built entirely of brick upon stone foundations with the entire east foundation and 50 feet (15.24 m) of the south section being part of the 1856 wooden blacksmith shop. Floors in the present building are of dirt/cinder composition (HAER IL-8-56). The east and west facades are 150 feet (45.72 m) long and 22 1/2 feet (7.98 m) high (HAER IL-8-3 & 17). The original south facade is no longer extant (see

the upper half of it in historic photos HAER IL-8-79 & 82), but probably resembled the present north facade (HAER IL-8-6). The present south wall was constructed as part of the original building and served to divide the blacksmith shop from a boiler shop. Both the north and south facades are 80 feet (24.38 m) in length.

Openings in the walls include windows with limestone sills and either original arched brick lintels, or steel lintels added at a later date (HAER IL-8-57 & 61). Window frames and sash are of wood as are several small doorways. Two large doorways, one on the west facade of the present rod shop and one between the blacksmith and rod shops include iron support columns and arches (HAER IL-8-60 & 63). The east facade of the present building, which is enclosed by the wheel bay, contains 1 original doorway and 16 windows (HAER IL-8-76 and 35mm 2-20, 23, 28). The exterior west facade had 2 doorways, one of which is now bricked closed, and twelve windows (HAER IL-8-17). There are 8 windows in the north facade, and the south facade has had a variety of openings including 2 different sets of windows and doors.

The east and west walls support Fan trusses constructed of double wrought pieces. The top cord and the 2 struts are of double channel iron, while the bottom cord and tie rod are double iron rods. All pieces are pinned or bolted together, and metal purlins support the roof between trusses (HAER IL-8-58 & 59). Wood roof decking is covered with tar paper and a ventilator runs along most of the ridgeline.

Boiler Room

The original boiler room was built in 1856 as a single story, flat-roofed wing to Machine Shop A. The east/west facades were 40 feet (12.19 m) long and the north/south walls were 24 feet (7.32 m) in length; all were built of limestone block. The south wall was shared with Machine Shop A and originally included 2 half-circle openings where the ends of boilers or boiler smokeboxes may have protruded into the machine shop (HAER IL-8-46 & 47). The north wall has a rectangular doorway framed in metal, although the original stone-arched doorway can be detected in the stone wall (HAER IL-8-48 and 35mm 3-7).

An addition 12 feet (3.66 m) wide was placed on the east facade in 1864. It included a stone facade matching the other shops (HAER IL-8-79), but this was replaced by the present brick facade sometime in the early 20th century (HAER IL-8-8 & 51). All that remains of the original 1856 stone facade are 2 short walls protruding from the north and south interior walls (HAER IL-8-46 & 48). The brick wall rests on concrete foundations and is finished with a stepped gable with terra cotta coping (HAER IL-8-51). Openings are formed by brick arched windows on 2 stories. All 6 windows are made of wood sash similar to others in the complex, although the 2 in the upper story pivot.

The lower section of the west facade is part of the original wall, although a modern steel framed doorway has removed much of the facade (HAER IL-8-49 and 35mm 2-31). The remaining stone section contains evidence of a number of openings including a very small stone-arched window, a rectangular doorway with a wooden lintel, a large circular hole that may have connected boilers to the chimney, and a cast iron hatch mounted at an angle in the wall that may have provided access to a boiler fire box or boiler stay bolts (HAER IL-8-50). When the building was changed from a flat-roofed structure to the

present gable design (about 1865), a stone gable was added to the top of the west wall (HAER IL-8-49 and 35mm 10-15).

The roof is supported by 2 variations of the Fink truss: one which combines I-beam top cords, double-rod bottom cords and ties, and a X-bar strut; and a second of riveted angle iron construction. Metal purlins connect the trusses and support a wooden roof with tar paper covering (HAER IL-8-46). A ventilator follows the ridgeline of the original section (HAER IL-8-8 & 85).

Tool Room

This building was constructed in two sections: the south half sometime before 1908 and the north half during the 1920's or 1930's. With the exception of a portion of the south wall that it shared with the boiler room, the structure was erected as a freestanding building with 3 exterior walls. The building is a rectangle, 112 feet (34.14 m) by 55 feet (16.76 m) with concrete foundations and floor. The south wall contains brick and stone sections from the boiler room with the western third of the wall and the gable being original with this structure (HAER IL-8-72 and 35mm 3-15). Double windows in the gable provide natural light for the shop area. The north façade is of the same dimensions with a single doorway and somewhat irregularly placed windows (HAER IL-8-2 and 35mm 3-9).

The east and west facades are of brick with steel support columns imbedded in the walls. Exterior brick coverings on these columns define 7 distinct bays on both sides of the building. On the east facade these bays include 2 windows each, except a single bay with a double-sized window. On the west facade double windows are used with no openings in 2 of the bays (HAER IL-8-8 & 73 and 35mm 2-33).

Compound Fink roof trusses rest on the steel columns in the east and west walls. All members are steel angle riveted to connecting plates at each intersection. An additional steel angle brace runs from the bottom cord to a position 8 1/2 feet (2.59 m) down the steel wall supports. Steel purlins connect trusses and support a wooden roof deck covered with tar paper. Five skylights are placed in the west side of the roof (HAER IL-8-74).

Rod Shop

The area enclosed by this building measures 110 feet (33.53 m) by 80 feet (24.38 m) and was constructed in several stages on stone and concrete foundations. The south half of the building was constructed as a boiler shop when the blacksmith shop was built in 1873. The present brick north wall was originally a partition wall in that structure (35mm 1-35A). The south wall of the area was an exterior wall of Machine Shop A (HAER IL-8-62). The newest portion of the building encloses an area defined by the 4 south bays of the east and west facades which were constructed between 1898 and 1908, enclosing the space between the blacksmith shop and Machine Shop A. These sets of bays each contain 3 rectangular double windows and a single doorway (HAER IL-8-64 and 35mm 2-1A, 15A, 19). The older north sections, originally the southern end of the blacksmith shop building, contain brick-arched windows with wood sash identical to those in the blacksmith shop. A single large arched doorway

on the west facade is framed by cast iron columns which match those supporting the former arched doorway in the partition wall (HAER IL-8-63 and 35mm 2-33).

A variety of roof trusses are present in the building. The initial set of trusses in the north half are identical to those in the blacksmith shop, and include wrought iron Fan trusses with double channels and dual rods and pins (HAER IL-8-65 & 66 and 35mm 1-35A). Those spanning the newer south half of the structure show elements of riveted Fink, Fan, and Compound Fink truss with vertical members constructed of built up angles, built up channels, double plane angles, and gusset plates (HAER IL-8-67 and 35mm 1-32A). Imposed on this system are additional trusses which supported 2 cranes that traveled north and south in the building. In the south half large steel beams are suspended from the roof trusses with part of the weight bearing on the south wall. In the north section the overhead craneways are supported by additional angle channel trusses added to the bottom cord structure, and Warren-type trusses laterally link the roof trusses (HAER IL-8-62, 65, 66, 35mm 6-2 & 8 and 9-36). Wood purlins support a wood deck with tar paper covering. Rows of skylights run the length of both sides of the roof.

Wheel Bay and Corridor

The corridor area contains no walls of its own and is defined by former exterior facades of the rod and blacksmith shops on the west and the tool and boiler rooms on the east. Wood clerestories surmount both original facades which are spanned by Town wood lattice trusses 31 feet (9.45 m) in length. The flat shed-type roof is covered with tar paper (HAER IL-8-68, 69, 70, 71, and 35mm 2-31, 3-19 & 20, and 10-6).

The north end of the wheel bay is defined by a 2-sided steel building measuring 40 feet (12.19 m) by 101 feet (30.78 m) which was constructed in 1954. Steel columns support open web joists, and the walls are corrugated sheet metal with metal framed windows and doors (HAER IL-8-7). Roof joists are supported on the west by a brick addition to the top of the east facade of the blacksmith shop (HAER IL-8-76 and 35mm 2-23 & 28). Joists are connected by dual open web girders which support the corrugated metal roof (HAER IL-8-75 and 35mm 3-4).

FOOTNOTES

[1]Aurora Beacon 7 December 1855; Aurora Guardian 17 July 1856; 4 September 1856. C.F. Allen was apparently superintendent of buildings and car repairs for the railroad, and in the fall of 1856 was also supervising construction of roundhouses in Chicago and Burlington. He was called "superintendent of woodwork and car repairing department" in 1858, but his name was no longer associated with the shops by the late 1860's.

[2]Aurora Beacon [August] 1855; Aurora Guardian 4 September 1856; Aurora Daily Beacon 10 October 1856; 23 October 1856.

[3]Aurora Daily Beacon 23 October 1856.

[4]Annual Report (June 1858), p. 22; (June 1859), p. 12; and field measurements, October 31-November 4, 1977, HAER. The junction of the original and new addition to the roundhouse is visible in Photograph HAER IL-8-14 and in 35mm photo 1-6A.

[5]Annual Report (June 1863), p. 31.

[6]Aurora Beacon [24] December 1863.

[7]Annual Report (June 1865), p. 30; and (June 1966), p. 34; and "Aurora Shops" [1878 site plan], CB&Q Papers 33 1870 8.13. See also photos HAER IL-8-46, 48, 49.

[8]Annual Report (June 1865), p. 28.

[9]Annual Report (June 1866), p. 34. The junction of the 1859 and 1866 sections is in the middle of photo HAER IL-8-13 (see also 35mm 5-6A). Interior views of the 1866 section are found in photos HAER IL-8-25 & 26.

[10]Aurora Beacon 21 May 1873; and 9 July 1873.

[11]Aurora Beacon 9 July 1873; 15 October; 25 October 1873; Railroad Gazette (August 23, 1873): 343; (November 29, 1873): 479; and Annual Report (February 1874), pp. 12, 41, 42. See present north facade in photo HAER IL-8-6.

[12]Aurora Beacon 5 January; 28 September; 26 October 1878. The first structural steel turntables used by the CB&Q were not installed until 1884; see Railroad Gazette (May, 1937): 344-347. The roundhouse had a 45' turntable in the latter half of 1878, but it is not clear whether this was the old one or the new one; see "Aurora Shops" [1878 site plan], CB&Q Papers 33 1870 8.13.

[13]A 20" brick addition was made to the top of the outside walls as well; see photo HAER IL-8-32. Aurora Beacon 18 May; 22 June; 27 July; 10, 24, 31 August; 7 & 28 September 1878. Compare historic photo HAER IL-8-81

with 35mm photo 5-16A, which were both taken from approximately the same location.

[14]"Aurora Shops [1878 site plan]," CB&Q Papers 33 1870 8.13.

[15]"Estimated Costs....[p. 1]," October 12, 1878, CB&Q Papers 33 1870 8.13. See photographs HAER IL-8-5 & 9.

[16]"Estimated Costs....[p. 2]," October 12, 1878, CB&Q Papers 33 1870 8.13. See photographs HAER IL-8-14, 15, 16.

[17]"Estimated Costs....[p. 3]," October 12, 1878, CB&Q Papers 33 1870 8.13. See photographs HAER IL-8-17 & 64.

[18]"Piping Diagram South End of Aurora Shops," September 18, 1908, HAER IL-8 File, Washington, D.C.; and "Location of Fire Alarm Boxes, Hose Houses & City Water Hydrants," July 17, 1923, HAER IL-8 File, Washington, D.C.

[19]"Fire Box Locations" (1923); Railway Review 78 (January 23, 1926): 180; and "Souvenir Programme" (1940).

[20]"Piping Diagram" (1908); "Fire Box Locations" (1923); and "Souvenir Program" (1940).

[21]Aurora City Directory (1868).

[22]Aurora Beacon News 16 August 1926; and Railway Review 78 (January 23, 1926): 180.

[23]No description of erecting procedures at Aurora has been found, but the methods used in 1927 by the Lima Locomotive Works provide some hints as to how this operation must have occurred; see Richard J. Cook, Super Power Steam Locomotives (San Marino, Calif.: Golden West Books, 1966), pp. 78-80.

[24]Corbin and Kerka, Steam Locomotives, pp. 256-291.

[25]"Remodeling Present Erecting Shop for Use as a Forge Shop" [blue line], revised February 17, 1927, HAER IL-8 File, Washington, D.C.; and "Spring Shop Arrangement and Roundhouse Change" [blue line], revised June 16, 1942, HAER IL-8 File, Washington, D.C.

[26]"Souvenir Programme" (1940); and "Spring Shop Arrangement" (1942).

[27]Aurora Guardian 4 September 1856; Aurora Beacon [24 December] 1863; Aurora City Directory (1868). Most of the machine shop tools were made by Bement, Sellers, and the Putnam Machine Company, while the slotting machine and a radial drill were manufactured by Bement and Dougherty; see Railroad Gazette (28 October 1871): 308-309.

[28]Railway Mechanical Engineer 106 (August 1932): 335-337. This article also contains several photographs, including one of valves being moved out of the west doorway of Machine Shop B.

[29]Aurora City Directory (1858), pp. 115-116; Aurora Beacon [24 December] 1863; and Aurora City Directory (1868).

[30]Annual Report (February 1974), p. 42; Aurora Beacon 20 November; 7 December 1878.

[31]Aurora Beacon 5 January 1878; "Piping Diagram" (1908); "Fire Box Locations" (1923); Railway Review 73 (July 7, 1923): 33; 78 (January 23, 1926): 180; Railway Track and Structures 18 (April 1922): 153; "Souvenir Programme" (1940); and Joe Schindlbeck, "Notes on the 1923 Plan," December 12, 1982, Aurora Preservation Commission.

[32]Aurora Beacon 15 & 25 October 1873.

[33]American Engineer and Railroad Journal (October 1904): 382-383; and Cook, Super Power, p. 71. See also photos HAER IL-8-56 & 57 and 35mm photos 10-23, 1-18A & 24A. A single jib crane similar to those used in the blacksmith shop still stands in the tool room; see 35mm photo 3-11. Figure 11 is based upon sketches and notes made on-site in 1983 by John W. Johnson of Iowa City, Iowa, President of the Mid-Continent Railroad Museum in North Freedom, Wisconsin.

[34]"Aurora Shops" [1878 site plan], CB&Q Papers 33 1870 8.13.

[35]Railway Mechanical Engineer 99 (June 1925): 351-354. This detailed article includes photographs of most of the machinery as well as a floor plan of the shop which is reproduced as Figure 12. Additional photographs of rod production at another shop are found in Cook, Super Power, pp. 72-73.

[36]Railway Mechanical Engineer 111 (February 1937): 81-82. This brief article also has several photographs of machinery in operation. Footings upon which supports for the traveling crane sat are visible in the left side of photo HAER IL-8-68. Cook's Super Power includes photographs of locomotive wheels being machined in the Lima Works (see pp. 74-75).

PART III

FURTHER RESEARCH

The historical narrative presented in Part I was constructed primarily from the annual reports of the company, local newspaper accounts, and reports published in railroad periodicals. Information on the construction history and functional characteristics of the buildings contained in Part II came from many of these same sources as well as from company documents, on-site observation, and contemporary and historic photographs. Both of these sections could be expanded through additional research.

Local newspapers from 1854 through about 1886 have been carefully searched for references to developments at the shop complex. Scattered reports of shop-related activities have been found for subsequent years, but these newspapers have not been thoroughly searched. Such research might document more precisely when Machine Shop C was built, when the final section of Machine Shop B was added, when a new facade was put on the boiler room, and when the two sections of the tool room were completed. Newspapers also contain many references to the specific functions taking place in certain buildings, and it is likely that more details would be found with additional research. Finally, local newspapers reveal a good deal about the relationship between the local community and the shops, working conditions, and the size of the labor force.

A fairly complete search of appropriate railroad periodicals has been made for this report, although again additional work could be done. Most of the periodicals were searched by using the indices bound with each volume, and therefore reports of activities at Aurora or by the CB&Q in general may have been missed if they were not correctly referenced. The earliest volumes of Railway Age, for example, are very difficult to use and it is possible that articles of interest have been overlooked. The bibliography contains a list of those railroad periodicals that have been examined for this report.

The most important untapped resource for the history of the CB&Q Railroad in general and the Aurora shops in particular are the company papers housed in the Newberry Library in Chicago. A guide to this enormous collection of documents has been published and must be used when working with the collection.[37] The 1878 site plan and accompanying letters, the 1876 employee rosters, and the engine repair records used in this report were located with the help of this important reference tool. The guide, however, was published in 1949 and does not contain information on a large quantity of early 20th century materials that have been deposited in more recent years. Extensive examination of these papers would probably reveal a great deal more about policy decisions within the company that affected the construction, modification, and use of buildings at Aurora.

Finally, the role played by the shops in the development of the City of Aurora has only been lightly touched upon in this report, but could provide the focus for a major research project. Following the examples provided by recent community and labor historians, researchers could link employee rosters to city directories, census schedules, and land records to discover the ethnic

backgrounds, residential patterns, and family characteristics of shop workers. Further analyses of these materials could look at the stability of the workforce, the existence of occupational mobility within the shops, and the response of the workforce to the functional evolution of the complex.

FOOTNOTES

[1] Guide to the Burlington Archives in the Newberry Library 1851-1900. Compiled by Elisabeth Coleman Jackson and Carolyn Curtis. (Chicago: The Newberry Library, 1949).

APPENDIX

STEAM LOCOMOTIVE CONSTRUCTION
CHICAGO, BURLINGTON AND QUINCY RAILROAD

Key to Abbreviations:

Wheel Arr. = Wheel Arrangement
Const. Dates = Construction Dates
AU = Aurora, IL
WB = West Burlington, IA
H = Havelock, NE
Othr CB&Q = Other CB&Q
Othr Co's. = Other Companies

Class Name/ sub-class	Wheel Arr.	Const. Dates	AU	WB	H	Othr CB&Q	Othr Co's.	Total
American	4-4-0							
A-1		1880-1890	44	16		30	63	153
A-2		1868-1896	31	6		26	111	174
Rebuilt A-2		1915-1917	25	12	33	35		105
A-3		1870-1887				13	14	27
A-4		1869-1897		2		1	2	5
A-5		1879-1896	2			2	1	5
A-6		1892-1901	2				8	10
Switcher/tender	0-6-2-T	1889-1893	5					5
Switcher	0-4-0	1869-1888	18	1		5	4	28
Switcher	0-10-0	1891					3	3
Switcher	0-6-0							
G-1		1885-1898	16	9	4	12	43	84
G-2		1899				2		2
G-3		1900-1913	69	37	23		50	180
G-4A		1879-1888	1	4			50	55
G-4 (rebuilt D-2)		1888		1			11	12
G-5		1919					10	10
G-5A		1921					15	15
G-6		1905-1910	7	11	4			22
G-10		1904-1906					35	35
Switcher	0-8-0							
F-1		1919					10	10
F-2		1908-1909					7	7

Ten-Wheeler	4-6-0							
K-1		1891-1892					28	28
K-2		1892-1896		5	7		28	40
K-3		1887					15	15
K-4		1900-1904			24			24
K-5		1904-1905			8			8
K-6		1897					3	3
K-7		1896					3	3
K-9		1890					2	2
K-10 (rebuilt Moguls)		1908-1914	14		5			19
Mogul	2-6-0							
H-1		1888-1895	20	17		12	67	116
H-2		1892-1898	10	4		4	45	63
H-3		1898-1899	7	11				18
H-4		1899-1900	4	4			35	43
H-5		1871,1887					11	11
Prairie	2-6-2							
R-1		1900		4				4
R-2		1901		10			50	60
R-3		1902					50	50
R-4		1904-1906					140	140
R-5		1906-1907					175	175
Atlantic	4-4-2							
P-1		1899-1902					16	16
P-2		1903					25	25
P-3		1904-1905					20	20
Pacific	4-6-2							
S-1		1906-1909					70	70
S-2		1910					50	50
S-3		1915,1918					25	25
S-4	4-6-4	1930					12	12
Consolidation	2-8-0							
D-2		1884-1888	2	3			14	19
D-3		1898					4	4
D-7		1903					2	2
D-4A&B		1903					100	100
Mallet	2-6-6-2							
T-1		1908					3	3
T-1A		1909					5	5
T-2		1910					5	5
T-3	2-8-8-2	1911					1	1

Mikado	2-8-2							
O-1		1910-1911					60	60
O-1A		1917-1923					148	148
O-2		1912-1913					100	100
O-3		1915-1919					60	60
O-4		1919					15	15
Northern	4-8-4							
O-5		1930					8	8
O-5A		1936-1940		28				28
Santa Fe	2-10-2							
M-1		1912					5	5
M-2		1914					23	23
M-2A		1914-1921					47	47
M-3		1919					10	10
Texas	2-10-4							
M-4		1927-1929					18	18
Mountain	4-8-2							
B-1		1922					8	8
B-1A		1925					13	13
TOTALS			277	183	112	102	2023	2699

Notes: (a) "Othr CB&Q" includes other shops of the line such as Galesburg, Hannibal, St. Joseph, Plattsmouth, and unspecified company shops.

(b) "Othr Co's" includes all outside locomotive works such as Baldwin, Brooks, Lima, Rogers, Cooke, Hinkley, Rome, Pittsburgh, and Schenectady.

This table was compiled from locomotive rosters printed in Bernard Corbin and William Kerka, Steam Locomotives of the Burlington Route (New York: Bonanza Books, 1978), pp. 256-291. The roster does not include all locomotives ever built or used by the system, but does include all those in operation in 1904 and all those built after this date.

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO FIELD PHOTOGRAPHS

CHICAGO, BURLINGTON, and QUINCY
RAILROAD ROUNDHOUSE and BACKSHOP COMPLEX
Broadway and Spring Streets
Aurora, Kane County, Illinois

HAER Number IL-8

Documentation: 76 photographs (1983)
14 copies of historic photographs and drawings
119 data pages (1983)
11 rolls of 35mm field photographs

ROLL 1

FRAME #	IDENTIFICATION
1A	Roll ID
2A - 3A	Machine Shop C; looking in SE door
4A - 6A	Blacksmith Shop; S wall and heater, looking S
7A - 8A	Blacksmith Shop; interior E wall, far right; looking E
9A - 11A	Blacksmith Shop; interior E wall, second from right; looking E
12A - 14A	Blacksmith Shop; interior E wall, third from right; looking E
15A - 17A	Blacksmith Shop; interior E wall, far left; looking E
18A - 20A	Blacksmith Shop; interior S wall; looking S
21A - 24A	Blacksmith Shop; interior N wall; looking N
25A - 27A	Blacksmith Shop; interior W wall, right side; looking W
28A - 30A	Blacksmith Shop; interior W wall, left side; looking W

31A - 34A	Rod Shop; interior N wall; looking N
35A - 36A	Rod Shop; interior S wall; looking S

Photographed: September 1983

By: John G. Kolp and Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 2

FRAME #	IDENTIFICATION
0A	Roll ID
1A - 3A	Rod Shop; interior W wall, left side; looking W
4A - 6A	Rod Shop; interior W wall, right side; looking W
7A - 9A	Rod Shop; interior E wall, left side; looking E
10A - 12A	Rod Shop; interior E wall, right side; looking E
13A - 15A	Corridor; interior W wall, far left; looking W
16A - 18A	Corridor; interior W wall, second from left; looking W
19A - 21A	Corridor; interior W wall, third from left; looking W
22A - 24A	Wheel Bay; interior W wall, fourth from left; looking W
25A - 27A	Wheel Bay; interior W wall, far right; looking W
28A - 30A	Corridor; interior E elevations, far right; looking E
31A - 33A	Corridor; interior E elevations, second from right; looking E
34A - 36A	Corridor; interior E elevations, far left; looking E

Photographed: September 1983

By: Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 3

FRAME #	IDENTIFICATION
1	Roll ID
2 - 5	Wheel Bay; interior elevations; looking N
6 - 7	Boiler Room; interior detail; previous door filled in; looking N
8 - 10	Tool Room; interior N elevation; looking N
11 - 13	Tool Room; hoist detail; looking NW
14 - 15	Tool Room; interior S elevation; looking S
16 - 18	Blacksmith Shop and Wheel Bay; exterior N elevation; junction between buildings; looking SW
19	Wheel Bay; interior detail showing crane washed, date, and initials; looking S
20 - 22	Wheel Bay; interior of corridor; looking S
23 - 25	Machine Shop A; interior elevation; looking E
26 - 28	Machine Shop A; interior elevation; looking W
29 - 30	Machine Shop A; interior elevation; wall-mounted derrick; looking S
31 - 33	Machine Shop A; truss detail; bottom cord; center junction
34 - 36	Machine Shop A; truss detail; top and bottom cords; junctions same between shoe and crown

Photographed: September 1983

By: Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 4

FRAME #	IDENTIFICATION
1A	Roll ID
2A - 4A	Machine Shop A; truss detail; top and bottom cords
5A - 7A	Machine Shop A; truss detail; crown junction
8A - 10A	Machine Shop C; column detail; looking E
11A - 12A	Machine Shop C; ceiling detail; looking E
13A - 15A	Machine Shop B; interior elevation; looking W
16A - 18A	Machine Shop C; interior elevation; looking W
19A - 20A	Machine Shop C; overhead door detail between Machine Shop C and 1856 Roundhouse; looking S
21A - 23A	Machine Shop B; interior elevation; looking E
24A - 26A	Machine Shop B; truss detail; top and bottom cords of center junction
27A - 29A	Machine Shop B; truss detail; top and bottom cords; middle junctions
30A - 33A	Machine Shop B; truss detail; top and bottom cords; junction next to shoe
34A - 36A	Machine Shop B; truss detail; showing center of truss

Photographed: September 1983

By: Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 5

FRAME #	IDENTIFICATION
1A	Roll ID
2A	Machine Shop B; exterior W elevation; safety sign; looking E
3A - 5A	Blacksmith Shop; exterior W elevation; exterior support for inside derrick; looking E
6A - 8A	Roundhouse; 1856, 1859 sections; exterior W elevation; junction between 1856 and 1859 Roundhouse; looking E
9A - 11A	Roundhouse; 1859, 1866 sections; exterior E elevation; junction between 1859 and 1866 Roundhouse; looking NW
12A - 14A	Roundhouse; 1866 section; Roundhouse courtyard; 1866 inside door detail; looking S
15A - 17A	Roundhouse; 1866 section; Roundhouse courtyard; 1866 inside door hinge detail; looking S
18A - 20A	Roundhouse; 1859, 1866 sections; inside Roundhouse courtyard; junction between 1859 and 1866; Roundhouse; looking NW
21A	Roundhouse; 1856, 1859 sections; inside Roundhouse courtyard; junction between 1856 and 1859 Roundhouse; looking NW

Photographed: September 1983

By: Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 6

FRAME #	IDENTIFICATION
1	Roll ID
2 - 3	Rod Shop; truss addition for overhead cranes; looking N
4	Rod Shop; overhead crane showing power bars and contact wires; looking N
5 - 6	Rod Shop; gear train detail on overhead crane
7 - 8	Rod Shop; truss addition for overhead crane; looking N
9 - 10	Rod Shop; detail (#2 truss from North); modified truss attachment for overhead crane, E wall
11 - 12	Rod Shop; detail (#5 truss from North); integral truss attachment for overhead crane, E wall
13 - 14	Rod Shop; window detail; looking W
15 - 16	Rod Shop; door detail (bricked in); looking S
17 - 18	Rod Shop; Oxy & Gas Dist. (acetylene and oxygen for cutting and welding); looking E
19 - 20	Rod Shop; detail cast iron arch support; looking N
21 - 25	Machine Shop B; detail truss; looking W
26 - 27	Roundhouse; 1856 section; detail of pulley in Roundhouse (between west two doors, inner wall, leading to the Machine Shop); looking N
28 - 29	Roundhouse; 1859 section; machine location (center outside); looking W
30 - 31	Roundhouse; 1859 section; traveling crane detail; looking SE
32 - 34	Roundhouse; 1866 section; floor channels in Spring Shop (piping for tempering - shot from Oil Storage Tank); looking SW

35 - 36 Vat Room extension to original Roundhouse; looking SW

Photographed: September 1983

By: John W. Johnson
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 7

FRAME #	IDENTIFICATION
1A	Roll ID
2A - 4A	Roundhouse; 1856, 1859 sections; inside Roundhouse courtyard; junction between 1856 and 1859 Roundhouse; looking NW
5A - 7A	Roundhouse; 1856 section; Roundhouse courtyard; casting mark on arch; looking N
8A - 10A	Roundhouse; 1866 section; inside Roundhouse courtyard looking at 1866 section; main through doors to other Roundhouse; looking S
11A - 13A	Roundhouse; 1856 section; interior of 1856 Roundhouse; right side; looking E
14A - 16A	Roundhouse; 1856 section; interior of 1856 Roundhouse; left side; looking E
17A - 20A	Roundhouse; 1856 section; interior of 1856 Roundhouse looking up toward overhead hoist; looking E
21A - 23A	Roundhouse; 1859, 1856 sections; interior wall between 1859 and 1856 Roundhouse; showing two wall-mounted derricks; looking NE
24A - 26A	Roundhouse; 1859 section; interior of 1859 Roundhouse; looking S
27A - 29A	Roundhouse; 1866, 1856 sections; interior of 1866 Roundhouse; wall between 1866 and 1856 Roundhouse; looking E
30A - 32A	Roundhouse; 1856, 1866 sections; interior wall between 1856 and 1866 Roundhouse; looking W

33A - 35A Roundhouse; 1856 section; truss detail; looking N

Photographed: September 1983

By: Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 8

FRAME #	IDENTIFICATION
1	Roll ID
2 - 3	Roundhouse; 1856 section; truss detail; bottom cord; looking N
4	Roundhouse; 1856 section; truss detail; bottom cord; looking N
5 - 6	Roundhouse; 1856 section; truss roller mark; diagonal support
7 - 9	Roundhouse; 1856 section; truss roller mark; top cord
10 - 12	Roundhouse; 1856 section; truss shoe detail; looking E
13 - 14	Roundhouse; 1856 section; from center of courtyard; panoramic view
15 - 16	Roundhouse; 1856 section; from center of courtyard; panoramic view
17 - 18	Roundhouse; 1856, 1859 sections; from center of courtyard; panoramic view
19 - 20	Roundhouse; 1859 section; from center of courtyard; panoramic view
21	Roundhouse; 1866 section; from center of courtyard; panoramic view

Photographed: September 1983

By: Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 9

FRAME #	IDENTIFICATION
2	Roll ID
3 - 5	Roundhouse; 1866 section; from center of courtyard; panoramic view
6 - 7	Roundhouse; 1866 section; from center of courtyard; panoramic view
8 - 10	Roundhouse; 1856 section; from center of courtyard; panoramic view
11 - 13	Machine Shop B; truss elevation; looking W
14 - 16	Roundhouse; 1859 section; derrick and floor mounted bases; looking W
17 - 19	Roundhouse; 1859 section; manual overhead hoist detail; right side hoist; looking N
20 - 22	Roundhouse; 1866 section; fire door detail; looking N
23	Roundhouse; 1856 section; truss shoe detail; looking N
24 - 26	Roundhouse; 1856 section; connection between column and arch
27 - 30	Roundhouse; 1856 section; steam tunnel with rails; looking S
31 - 33	Rod Shop; arch detail; looking N
34 - 36	Rod Shop; truss detail

Photographed: September 1983

By: Bruce Harms
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 10 - COPIES OF HISTORIC PHOTOGRAPHS IN THE COLLECTION OF THE AURORA HISTORICAL SOCIETY

FRAME #	IDENTIFICATION
0A	Aerial photograph of the south half of the CB&Q R.R. Shops, 1955, showing the first roundhouse and backshops
1A	Roundhouse, stalls 18-23, shop crew and two locomotives. Locomotive #1158 is a class A-2 American built in Aurora in 1881. Photographed between 1898 and 1904
2A	Car department, woodworking mill located on first floor of larger building, telegraph, cabinet and pattern shops on second floor, power plant is smaller structure, photograph dated 1898
3A	Paint shop, coach shop, car shop, and blacksmith shop (all car department), all north of the roundhouse and locomotive shops. Photographed between 1880 and 1888
4A	"View of Truck Shop, 1908...and Pipe Shop"
5A	"First Round House" - likely 2nd or a roundhouse at another site
6A	Undated Aerial View of Aurora Shops Complex; post 1954
7A	"Kerr's Patent Coal Chute; Pat'd. Oct 2nd 1866; first wood chutes; wrecked before 1886"
8A	CB&Q Shops Building (unknown); photo "taken 5-18-1915"
9A	"Burlington Store House that burned down"
10A	"Construction of way cars in Old Freight Shop around 1908"
11A	West side of Blacksmith and Rod Shop
12A	Looking north along east side of roundhouse and shops, "Superintendent's Office at Left", taken from the water towers along Broadway. Locomotive blacksmith shop in right center distance with car department shops beyond, most likely taken in 1898

13A	Wheel bay and corridor, facing south, March 1974
14A	Car Shops, c. 1960
15A	Aerial view of Aurora Shops Complex, 1974
16A	"Chicago, Burlington, & Quincy R.R. Car Works Aurora, Ill." Photocopy of an undated lithograph based on an ambrotype by D. C. Pratt, c. 1857
17A	CB&Q "Wrecker before 1877, looking West"
18A - 20A	CB&Q Roundhouse at another site (Galesburg?)
21A	Reverse of previous photo (18A - 20A)
22A - 23A	First roundhouse and shops. Photograph taken between 1874 and 1878, at the same time as IL-8-78. Looking north. One-half of stereopticon pair.
24	"Spring and Lincoln looking northwest to shops"... "Freight house and wood shantes foreground" (Roundhouse visible in near distance is the second roundhouse built at Aurora, 1868 - 1872). Photograph taken between 1874 and 1878. One-half of stereopticon pair.
26A - 27A	Staff of Electric Shop, 6-13-1935
28A - 30A	"Spring and Lincoln looking northwest to shops"... "Freight house and wood shantes foreground" (Roundhouse visible in near distance is the second roundhouse built at Aurora, 1868 - 1872) Photograph taken between 1874 and 1878
31A	First roundhouse and shops. Photograph taken between 1874 and 1878, at the same time as IL-8-78. Looking north
32A - 35A	First roundhouse and shops. Photograph taken between 1874 and 1878, at the same time as IL-8-78. Looking north. Detail from stereopticon pair.

36A	"Spring and Lincoln looking northwest to shops"... "Freight house and wood shantes foreground" (Roundhouse visible in near distance is the second roundhouse built at Aurora, 1868 - 1872). Photograph taken between 1874 and 1878. One-half of Stereopticon Pair.

Photographed: September 1983

By: Hans Muessig and John W. Johnson
DENNETT, MUESSIG, RYAN & ASSOCIATES, LTD.
Iowa City, Iowa

ROLL 11 - COPIES OF HISTORIC PHOTOGRAPHS IN THE COLLECTION OF THE AURORA HISTORICAL SOCIETY

FRAME #	IDENTIFICATION
0 - 0A	Roundhouse, stalls 18-23, shop crew and two locomotives. Locomotive #1158 is a class A-2 American built in Aurora in 1881. Photographed between 1898 and 1904
1A - 2A	Car department, woodworking mill located on first floor of larger building, telegraph, cabinet and pattern shops on second floor, power plant is smaller structure, photograph dated 1898
3A - 4A	Paint shop, coach shop, car shop, and blacksmith shop (all car department), all north of the roundhouse and locomotive shops. Photographed between 1880 and 1888
5A - 6A	"View of Truck Shop, 1908...and Pipe Shop"
7A - 8A	"First Round House" - likely 2nd or Roundhouse at another site
9A - 10A	Undated Aerial view of Aurora Shops Complex; post 1954
11A - 12A	"Kerr's Patent Coal Chute; Pat'd. Oct 2nd 1866; first wood chutes; wrecked before 1886"
13A - 14A	"View of Truck Shop, 1908...and Pipe Shop"
15A - 16A	Paint shop, coach shop, car shop, and blacksmith shop (all car department), all north of the roundhouse and locomotive shops. Photographed between 1880 and 1888

17A - 18A	Car department, woodworking mill located on first floor of larger building, telegraph, cabinet and pattern shops on second floor, power plant is smaller structure, photograph dated 1898
19A - 20A	Roundhouse, stalls 18-23, shop crew and two locomotives. Locomotive #1158 is a class A-2 American built in Aurora in 1881. Photographed between 1898 and 1904
21A - 22A	Aerial photograph of the south half of the CB&Q R.R. Shops, 1955, showing the first roundhouse and backshops
23A - 24A	Wheel bay and corridor, facing south, March 1974
25A - 26A	Looking north along east side of roundhouse and shops, "Superintendent's Office at Left", taken from water towers along Broadway. Locomotive blacksmith shop in in right center distance with car department shops beyond, most likely taken in 1898
27A - 28A	West side of Blacksmith and Rod Shop
29A - 30A	"Construction of way cars in Old Freight Shop around 1908"

Photographed: September 1983

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